NATIONAL PUBLICATION FOR BUYING-USING-SELLING COMPUTER HARDWARE & SOFTWARE

VOL. 5 NO. 4
APRIL 1985

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- Integrated Software Promise & Performance
- 9-Track Tape Drive Unlocks Vast Storehouse Of Data
- Need An Answer? Ask The Guru—Don Lancaster
- Van Delray Explains Stroke Graphics
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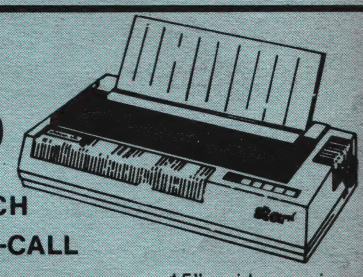

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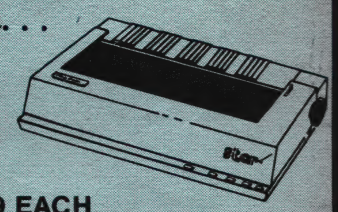

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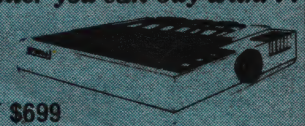

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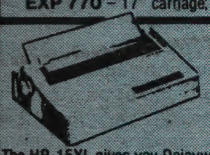

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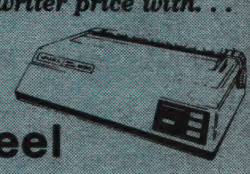

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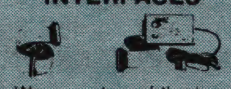

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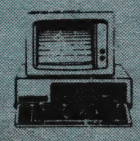

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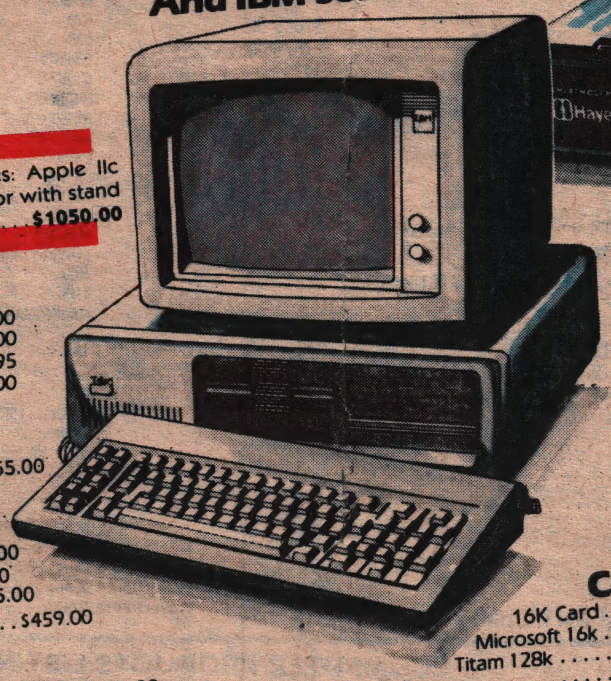

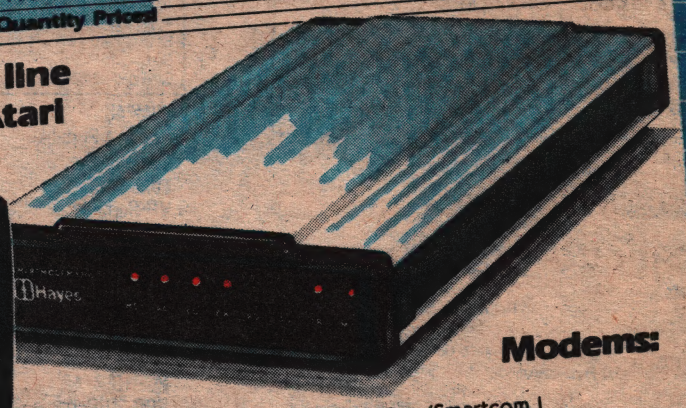

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Silver Fox Leads The Sanyo Pack

by Rich Fields

Sanyo is a well known and respected name in consumer electronics but they have never been able to make a big splash in the U.S. computer market. They are not alone, no Japanese company has really accomplished this mainly because they do not understand the U.S. personal computer market although they do very well with peripherals. The Japanese computer manufacturers do not seem to realize the difference in marketing techniques between the two product lines and seem unwilling to learn. Sanyo brought out 8-bit computers when the world was going 16-bit, they were not bad machines, (you will see them advertised in the pages of Computer Shopper at great prices!).

They do not spend money advertising in computer magazines because in Japan the manufacturers do not do so. They do provide cooperative advertising funds for their dealers which is why you see so many ads for Sanyo dealers.

They also do not send review machines to magazines or do any of the things that American manufacturers do to promote their machines. Can you visualize a Sanyofest?

Even at the computer shows the Japanese man their booths with Japanese nationals who hardly speak English. Ever try to ask one of those guys a technical question?

Sanyo did something right called the Sanyo 550/555 and even though they tried as hard as they could to keep them a secret, Sanyo 550/555 computers have become a cult thing with a loyal following of users. With cooperative advertising, they have sold over 86,000 of these little 16-bit machines in 13 months! Compare this with Apple's sales of Macintosh and the millions spent to advertise the Mac. Not bad Sanyo! To explain this phenomenon Computer Shopper decided to test one of the Sanyo 550/555 computers. Scottsdale Systems, one of our advertisers, supplied us with one of their Silver Fox versions, a highly enhanced version of the Sanyo. This computer had two 800K disk drives for a total of 1.6 megabytes of disk storage. It has 256K of RAM and comes with a printer port. Although there are no slots to plug-in the PC board, you can add serial ports, game ports, an 8087 co-processor and a hard disk. A new board should be out at the time you read this which will make the screen compatible with IBM PC video. This will increase the number of PC software packages able to run on the Sanyo. Make no mistake, the Sanyo is not IBM compatible although it is an MSDOS computer and it will run many packages adapted for it. The Silver Fox version we tested could read and write to all popular PC formats although it could not run many of them due to serious differences in the keyboard and video display. It seemed to me that most of the software packages it could run were ones originally adopted from CP/M versions like WordStar. The people at Scottsdale say that with the new video adapter board, their version of the computer will run more of the PC programs.

The Sanyo has a small footprint on the desk, 15" wide by 14-1/4" deep by 4-3/8" high. Generating both color and monochrome, either type of monitor can be used and connections for both types are provided on the rear panel. The video monitor supplied with our test unit was a 12" Sanyo CRT-30 with a full 25 x 80 display. It was a satisfactory monitor although I did not like the characters generated by the Sanyo video circuits.

The Sanyo keyboard was hard for me to be comfortable with, I am now so accustomed to the IBM PC keyboard that my fingers kept going to the missing keys. The Sanyo keyboard has the INS and DEL keys in a different position and the layout of the cursor pad is completely different which disturbed me the most since I do a lot of word processing. The most un-compatible thing about the keyboard is the lack of an ALT key. Many MSDOS programs use ALT key sequences making it essential for MSDOS operation. I am told that programs such as Lotus 1,2,3 and Flight Simulator have versions that run on the Sanyo using Control/Shift in place of the ALT key. The keys used on the keyboard are not bad but they are noisy. The large RETURN, CTRL and SHIFT keys are good. The illuminated LOCK key avoids one of my pet peeves with the IBM PC keyboard. There are only five function keys on the Sanyo, functions 6 through 10 are shifted positions on function keys 1 through 5. The function keys are marked "PF" for some reason. To conclude my description of the Sanyo keyboard I have to admit that if I had used only this keyboard I would have very few complaints about it. My problem is that I am used to the IBM PC and the Sanyo is a different computer close enough to the PC so I keep making comparisons.

Sanyo 550/555 Keyboard

Sanyo 550/555 computers come with various capacities of disk drives and RAM. The most inexpensive unit, the Sanyo 550-1 has one 160K disk drive and 128K of RAM. A second drive makes it a Sanyo 555-1. With one 320K drive the computer becomes Sanyo 550-2, a second 320K drive makes it a 555-2.

The Silver Fox is a Sanyo 550/555 computer that has been enhanced by Scottsdale Systems by the addition of two 800K, quad density disk drives and upgrading the RAM memory to 256K. Ordinary MSDOS will not run this computer, it requires a special version of MSDOS, copyright by A-OK Computer Co. who calls it A-OK DOS. Scottsdale Systems calls it "Hagan-Dos(tm)." Other Sanyo dealers who also sell such a system call it Sanyo 555-4. The thing that is different about the Scottsdale version is the software package that is supplied at no extra cost when you buy the package for $1397. You get Hagan DOS and the standard Sanyo MSDOS 2.11 (which you are warned not to run), Color BASIC, GW BASIC (equivalent to IBM BASICA), M-Disk, a RAM disk program, 15 Games and Utilities, WordStar, Mailmerge, CalcStar, ReportStar, SpellStar, FILEBASE, PC File III, PH Disk, and Easy Writer. You also get all the software manuals. The Micropro software alone provides the start of a software library. Many users may never need any more. If you had to pay the original retail prices the software would cost almost as much as the computer.

The Sanyo Color BASIC is excellent. It is graphics oriented and has windows and other features that make it a pleasure to use. The color commands are simple, as are the built-in routines to draw circles and lines. Considering the large number of MSDOS programs that use color, such as Lotus 1,2,3, I would recommend that you opt for the color version of the Silver Fox (or Sanyo 555) for $1,688 from Scottsdale Systems. Other Sanyo dealers offer slightly different combinations of the Sanyo 16-bit computers. Read the Computer Shopper and compare them yourself.

Conclusion

I was given this review to do because I was familiar with the IBM PC and had reviewed several clones in the past. I now feel my experience was not an asset, because I had too many preconceived notions of what an MSDOS computer should be like. The Sanyo 550/555 is a very good MSDOS computer and the Silver Fox version is the best one I operated. Some of the errors I made because of overconfidence would not have happened if I sat down and read the manuals before I used the machine. For example, I blew the system disk and my backup because I did not find the place in the operation manual that told me never to start the computer with disks in the drives. This is a strange thing and no one who ever operated a disk system would expect such instructions, but it was on pages 1-9. The RESET button is nice to have but the instructions tell you never to RESET with a program running. The only time I want to RESET is when my program is hung and running in a loop. What do I do? While we are on the subject of manuals - Sanyo supplies a liberal number of software manuals - usually the publishers manuals re-printed. There is no technical manual supplied for the computer. If you want one, the dealer has to order it for you at a cost of $15! Big Blue and Apple have taught me to expect better things. I would say one thing to express my feelings about the Sanyo. If you had never bought a computer and then bought the Silver Fox. You would be a happy man.

As a Sanyo owner I would like to feel that I too was part of a family of users. One way to do this is to become part of the National Sanyo Users Group. They publish a newsletter and have other items of interest for Sanyo 550/555 owners. To contact them: National Sanyo Users Group, PO Box 1358, Middlesboro, KY 40965. ●

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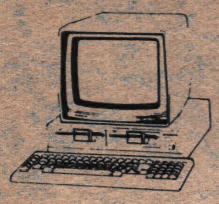

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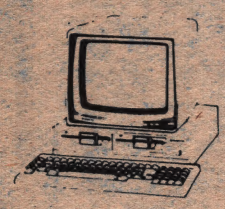

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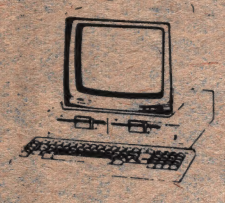

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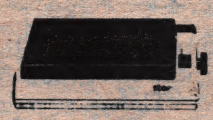

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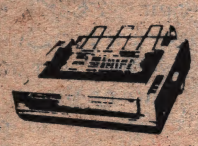

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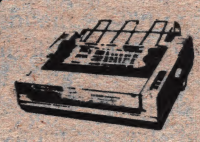

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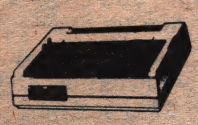

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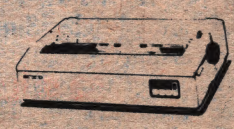

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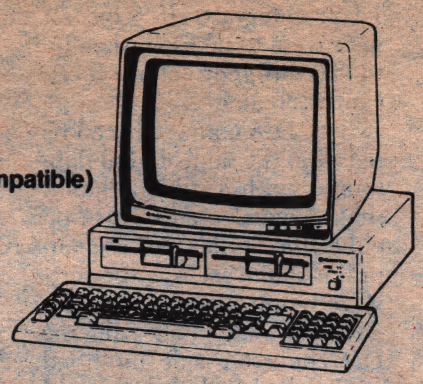

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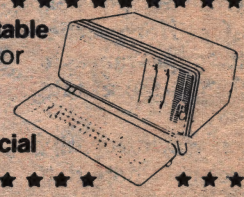

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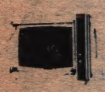

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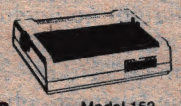

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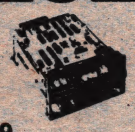

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Stroke Graphics

by L. Van Delray

The first article of this series covered CRT fundamentals and discussed conventional raster scanning. This part will cover another scanning technique, sometimes called X-Y, or vector scanning.

This video technique has been used for many years by the scientific, military, and medical communities for generating high-resolution complex graphics. It is now finding its way into video games as seen in arcades, but has not yet reached the personal computer. However, it will make its appearance in this area in the not-too-distant future.

The quickest way to identify stroke graphics is to note that unlike raster scan, straight lines are very straight and do not form a staircase no matter what their angle or how they are rotated; that curved surfaces do not look like circular-saw blades; and that alphanumerics do not have a dot structure, but are built up of very small straight lines.

The technique used to create stroke graphics is similar to that used in an oscilloscope. Although there is no raster, there are two sweep directions - called horizontal and vertical.

The basic block diagram of a stroke scan sweep system is shown in **Figure 1.** It is assumed that the sweep system is being driven from a digital computer.

The digital-to-analog- (D/A) converter used in both the vertical and horizontal stages, is a circuit that accepts the digital data from the computer and converts it into a proportional dc voltage. The chart shown in **Figure 2** shows how four bits of data can be used to create a zero-to-16-volt range scaled at 1-volt intervals. If 8-bits of data were to be used, then up to 256 different voltage levels can be created.

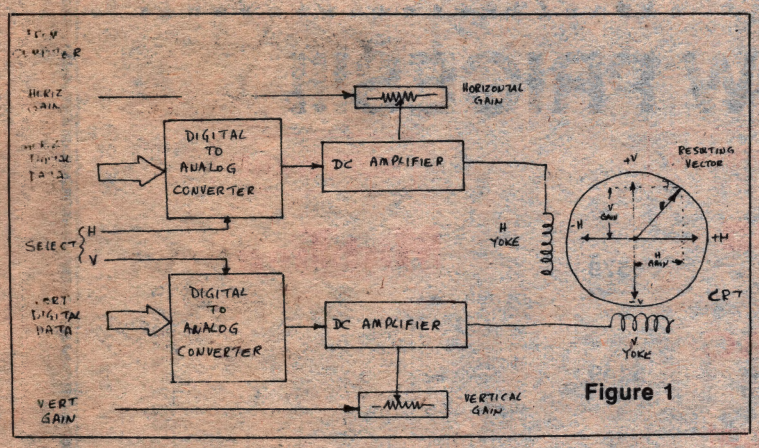

Figure 1

Both D/A converters can be fed from the same digital data source, with a special "handshake" signal used to turn on either the vertical or horizontal D/A converter as the software requires.

The output voltage from the D/A converter is dc amplified and applied to the vertical and horizontal yoke segments. As mentioned in Part I, the electron beam within the CRT can be influenced by a magnetic field.

Thus, when a current flows through the vertical portion of the yoke, the resulting magnetic field causes the electron beam to move in the vertical direction. When current flows through the horizontal portion of the yoke, the electron beam is moved in a horizontal direction. And, when current is applied to both yoke coils, the resultant electron beam motion is a vector whose angle is determined by the ratio of current flow in both coils.

Note also that both the vertical and horizontal dc amplifiers can be independently gain controlled by signals from the computer. This will allow a wide variety of shapes to be created without changing the original digital input signal.

The CRT electron beam current, which determines the video contrast, is also controlled by a digital signal from the computer, while the CRT brightness control is usually manually preset. The other elements within the CRT operate in the same fashion as their counterparts in raster scanning.

As an example of generating a vector scan, follow the insert of Figure 1. When no data is fed to the two A/D converters, no current flows through the yokes so the electron beam produces a bright spot at the center of the CRT screen.

When digital data is applied to the vertical D/A converter and dc amplifier, the bright spot will move in the vertical direction, to a distance proportional to the level of the binary encoded vertical input voltage.

As previously mentioned, Figure 2 shows how four digital "bits" can be combined to create any voltage between zero and 15 volts, in 1-volt increments. The voltages in Figure 2 can be determined by adding the BCD (Binary Coded Decimal) values in the column where a "1" occurs.

Note that in BCD, that value of the rightmost column (least significant bit) is "1". the next column is "2", the next "4", and the leftmost column (most significant bit) is "8". Note that each position value is exactly double that on its right.

The reader can see that if eight bits were used, the voltage value could be 256 volts, or, the BCD could be arranged so that there would be 256 increments between zero and (say) 5 volts. The values selected would depend on the refinements required by the user.

Now back to the CRT. If the vertical input is rapidly switched on and off, the spot will trace a bright line from the center (zero voltage on both axes) up the vertical line to the level of the input voltage.

Thus, the first lesson in stroke scanning. To draw a straight line, you need only specify both ends, and the electronics does the rest.

The reader can also see that the CRT can display a bright line between any two voltage points within the confines of the CRT sweeps. Since each line is a "stroke" the name stroke graphics was born. Also, since both X and Y axis are used, the name X-Y scanning is also used.

Figure 3 shows a very simplified way that allows some geometric forms to be drawn on the CRT using stroke scanning.

The rectangle in the upper left quadrant is drawn by applying a voltage to move the spot to the selected point of origin - in this case + 1 volt V and -5 volts H. If the vertical voltage is changed to + 2 volts with the horizontal voltage remaining at -5 volts, the leftmost upright will be drawn as shown by the arrow. The programmer can now choose which is to be the next line, and program the vertical and horizontal voltages accordingly.

Thus, you can now see that by simply specifying the desired voltage points, almost any kind of geometric figure - including alphanumerics - can be drawn using stroke graphics.

Referring back to the block diagram of Figure 1, note that if one of the two dc amplifiers has its gain changed, the on-screen shape will grow or

Continued On Page 12

BCD				Figure 2	VOLTS
⑧	④	②	①		
0	0	0	0	=	0
0	0	0	1	=	1
0	0	1	0	=	2
0	0	1	1	=	3
0	1	0	0	=	4
0	1	0	1	=	5
0	1	1	0	=	6
0	1	1	1	=	7
1	0	0	0	=	8
1	0	0	1	=	9
1	0	1	0	=	10
1	0	1	1	=	11
1	1	0	0	=	12
1	1	0	1	=	13
1	1	1	0	=	14
1	1	1	1	=	15

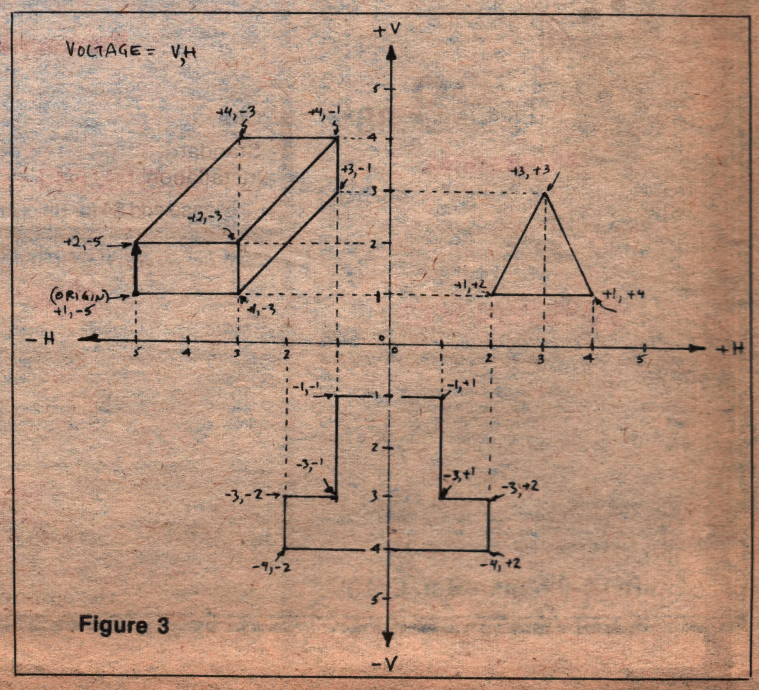

Figure 3

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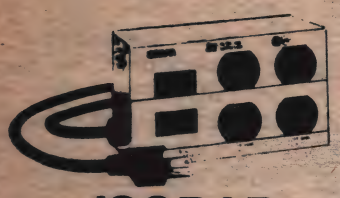

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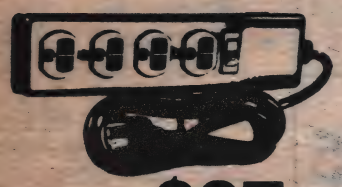

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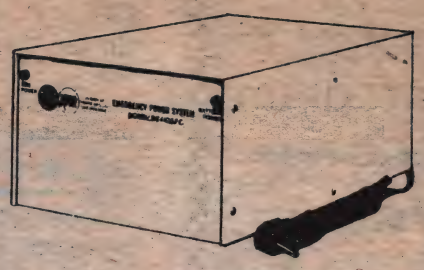

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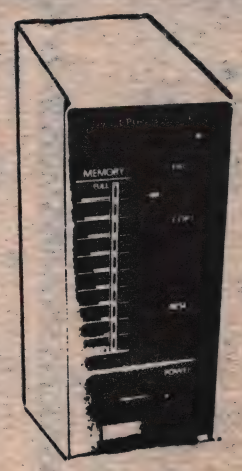

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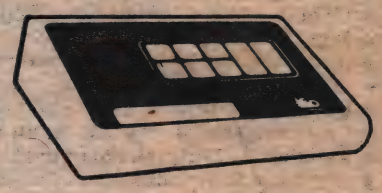

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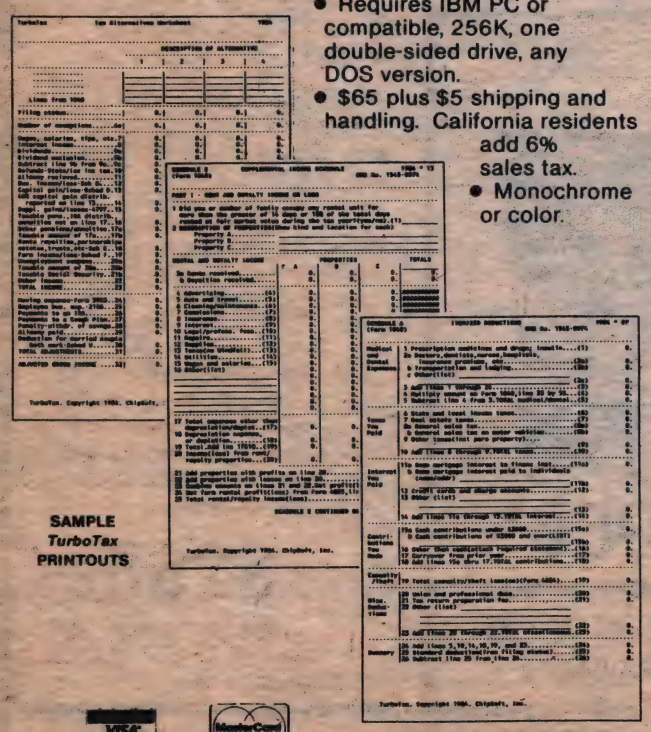

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Stroke Graphics

Continued From Page 10

diminish along the resulting vector, depending on whether the gain is increased or decreased.

For example, if the horizontal and vertical gains are similar, the resultant will be a line at 45 degrees. If the horizontal and vertical gains are changed with respect to each other, the displayed line can be moved through a broad range of angles from the horizontal to the vertical. The reader can play with the vectors to see how the dc amplifier gain can produce a number of differently angled lines, even though the input digital data is unchanged.

If both dc amplifiers have their gains simultaneously increased, the on-screen figure will enlarge - and conversely, if both amplifiers have their gains simultaneously decreased, the on-screen figure will reduce in size.

Thus, once again, although the digital input data has not changed, simply altering the gain of the dc amplifiers can cause a drastic change in the displayed form.

Note also that the CRT electron beam intensity is also controlled by a signal from the computer. In this manner, the "invisible" lines in the drawn figures can be blanked out while the electron beam can be turned on to draw the shape.

The other two shapes in Figure 3 illustrate the X and Y axes voltages required to form those shapes. Thus, merely specifying the vertical and horizontal input voltages, and the amplifier gains, a considerable number of different geometric forms can be traced on the CRT.

Note also that if the two input voltages are varied in the form of sine and cosine voltages, the X-Y axes sweep will form a circle (if the two inputs are of equal value), or an ellipse or arc if the two voltages are unequal.

This will allow a CRT to display curved surfaces with the sawtooth breakup as seen in a raster scan display.

Obviously, depending on the software, it is possible to construct all manner of shapes by combining sine, cosine, and "ordinary" voltages. Simply by changing the amplifier gains, the appearance of the shapes can be drastically altered.

For example, a small space ship can be drawn to appear as it would be in the distance. By simultaneously increasing the gains of both the vertical and horizontal amplifiers, the spaceship can be made to grow larger (as it comes closer to you) - without any apparent distortion. On the other hand, as the amplifier gains are reduced, the shape will get smaller - as it would if the spaceship were going away.

To create a screen-filling game, the programmer must store the end points of the many lines that go into making a particular shape, and then simple "call" the desired shape when required. The software must also control the amplifier gains so that the shapes can be altered as they move about the screen. This also applies to any required alphanumerics.

Screen positioning is also a function of the amplifier gains, and can be altered as required.

At the present time, all stroke systems use straight and curved lines to delineate the required shape. Unlike raster scan, stroke scan does not allow "filling in" the large areas of the shape with shading - at least not at the present.

The bulk of stroke-scan displays are in monochrome, although some are starting to appear in color. If a color CRT is used, it is possible to gate the desired electron gun on (there are three electron guns in a color CRT - one for red, one for blue, and one for green) at the desired time in the trace. Other colors are created by switching on more than one gun at a time.

At this time, color in stroke scan is also confined just to lines and not complete surfaces. This is one area where stroke scanning lags behind raster scanning.

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Editorial

By Stan Veit

SWTPC, Another Page For The History Book

With all the hoopla attending the tenth anniversary of the birth of the Altair, we tend to forget that we didn't get to this point on the S-100 Bus, although it was an important vehicle.

Southwest Technical Products and the M6800 SS-50 computers were just as important in the personal computer revolution as the 8080 and S-100 kits. There were a lot more of them sold and built than any other computer kit.

Southwest Technical Products did not start as a computer company but as a manufacturer of electronic construction kits for audio equipment and test instruments. It was the best company to kit electronic construction projects for Popular Electronics and Radio Electronics magazines and was often used for this purpose.

One of the very first computer construction projects to run in a magazine was Don Lancaster's TV Typewriter. This was to evolve into a home brew video terminal using a TV as the CRT. Don Lancaster worked for SWTPC developing the kit but SWTPC bought a different design from someone else and Don quit.

In the days before personal computers every student longed for a terminal to connect into the school computer. Teletypes were too expensive and video terminals (called "Glass Teletypes") were just starting and were also too expensive.

At the time the Altair article appeared in Popular Electronics, other companies were working on computers based upon Motorola's 6800 CPU. One of them, the Sphere appeared very shortly after the Altair and must be considered as the first desk top computer with a built-in CRT. Sphere had serious production problems and could not ship completed computers until well into 1976.

In the November 1975 issue of BYTE, Southwest Technical Products announced the SWTPC M6000 computer. It was an unusual machine, totally unlike the Altair and Imsai 8080 machines. The Altair-type machines had a front panel with flashing lights and red and blue paddle switches. You had to key in a bootstrap program so your machine would talk to the Teletype, then read a Teletype paper tape with the loader program. The final step was to load BASIC from yet another paper tape.

To operate the SWTPC M6800 all you had to do was to connect a terminal, either a Teletype or a Video Terminal such as the CT1024 Video Terminal (successor to the TV Typewriter). Then you turned on the computer and the MIKBUG program would immediately give you a prompt indicating it was ready. MIKBUG was a Monitor Program, which is really an operating system for a computer without a disk system. The monitor program allowed you to load programs, run programs, read and change the contents of memory and set break points for tracing program bugs. It spoke Hex allowing you to enter machine language programs directly from the keyboard. It also could read the Teletype keyboard or Teletype paper tapes; write to Teletype printer, or the Teletype tape punch if the system contained a cassette interface the monitor could read or write cassette tapes, (but that came later). The best part of MIKBUG was that it resided in Read Only Memory thus eliminating the necessity of loading it into the computer everytime you turned on the machine.

There were other striking differences between the S-100 machines and the SWTPC M6800. The S-100 machines came with a motherboard with provisions for 100 pin connectors. They only gave you 2 connectors, the rest you had to buy at $7 each and then solder in 100 pins per connector. The M6800 gave you all the connectors when you bought the basic kit and you installed them as part of the construction. There were connectors for 7 large 50 pin PC boards, used for the CPU and memory. This gave you room for the CPU and 4 memory boards. In the beginning the memory boards were 4K capacity, but later 8K boards came into use. The memory map of the M6800 provided for the first 32K of memory to be RAM. The second 32K was devoted to I/O port assignments and MIKBUG. Physically you could add up to 32K of RAM

if you could figure out a method of getting that huge amount into the computer. In the beginning all you got with the kit was 128 bytes of scratch pad memory needed by the ROM; later you got a free 4K memory board populated by 2K of RAM.

There were seven short slots for I/O boards, each slot addressed to a different I/O port location. (Bet YOU thought IBM invented the #%'# short slot!) The power supply was large enough to power all the boards in the computer. Since the top cover was perforated metal, you had no use for a fan and none was supplied.

Building the M6800 was much simpler than building an S-100 computer. The boards did not hold as many parts and the soldier areas on the lands were nice and wide. I first found out about the SWTPC M6800 at a meeting of the New Jersey club. A fourteen year old boy had built one and he showed it at the meeting. If HE could build one, so can anyone, I thought. This is the machine to sell in my store. The next day I called Dan Meyers the owner of SWTPC to ask about becoming his dealer in New York. Dan treated me to some of his Texas humor "New York, where's that?" "You know a guy named Solomon writes for that magazine","Sure, he is a close friend of mine" I said, "Too bad" said Dan "You can't be any good". (Dan and Les Solomon were old friends.) Nevertheless he made me a dealer and gave me the first credit I ever received in the personal computer business.

I built the first M6800 kit we received and it worked for many years without a hitch. We had to shut it down every so often to scrape the peanut butter off the motherboard but it never dropped a bit.

I had no CT-1024 Terminal to go with the computer and we used my Teletype to load Tom Pitman's Tiny Basic paper tape (cost $5). One day a kid walked into my store with the nicest CT1024 I had ever seen. He was a student at an exclusive East Side private school and he had built the terminal to use with the school's DEC computer. His name was Ken Stamm and he was the most dedicated SWTPC hacker I would ever meet. From the day he walked into my store he took over the SWTPC end of my business. If you came into the Computer Mart of New York to buy a computer and Ken got hold of you, you bought a SWTPC M6800 that was it. If you resisted, he ignored you completely until someone else dealt with you, or you left. I became one of the largest Southwest dealers mostly because of Ken. His mother was French and he spent part of each year in France. When he was away my sales went down, but I got a steady stream of French speaking customers who only wanted SWTPC computers.

Dan Meyers was one of the first people who realized that software was the engine that made computers sell! His software was not only good, but it was cheap.The price schedule is a clue to Dan's sense of humor. Assembler sold for $15, BASIC came in various sizes to fit your memory, 8K BASIC was $8, 12K BASIC was $12.00. If you were too cheap to buy a cassette with BASIC on it, you could get a listing for free! The SWTPC BASIC was written by a man named Robert Uterwyck who owned a shipping company in Tampa, Florida. He wrote software for a hobby and his BASIC was one of the best. Dan and Robert were the exact opposite of the classic computer person, both were businessmen who wore three piece suits and bought and sold companies. It was not long before the general atmosphere of the computer nuts got to them. At a big computer show the entire SWTPC crew, including the businessmen Dan and Robert showed up wearing Tee shirts with ALTAIR S--KS blazoned across the front!

While the price of the Altair or Imsai kit bought you only the start of a computer system for about $600, SWTPC M6800 cost $450 for a kit that included a complete computer with a 4K memory board populated with 2K of memory chips and a serial interface board. If you had a Teletype or Video terminal you received all you needed to run Tiny BASIC. By making a small investment for a second memory board ($125), plus the additional chips to populate the "free" memory board to 4K, you had a huge 8K computer running 4K BASIC.

The Teletype was the complete peripheral for the first personal computers. It provided the printer, the mass data storage in the form of punched paper tape and the reader to load the tape. It had three serious drawbacks. First: It cost more than the computers, at least $1,000 for a rebuilt one, or $1,800 for a new ASR-33 Teletype. Second: It was slow - painfully slow. It loaded, or printed at 110 baud, (10 characters per second.) Third: The paper tape was a terrible way to store programs, it twisted, tore and lost data until your hair stood on end. There had to be a better way! Several people suggested that audio cassettes would be a perfect way to store data and our resident Guru, Don Lancaster invented a way to do this. Dr. Suding of digital group, invented another way, MITS still another way. A tower of Babel was building. Finally on November 7 and 8, 1975 in Kansas City, Mo. BYTE magazine held a Cassette Standards Sym-

Continued On Page 31

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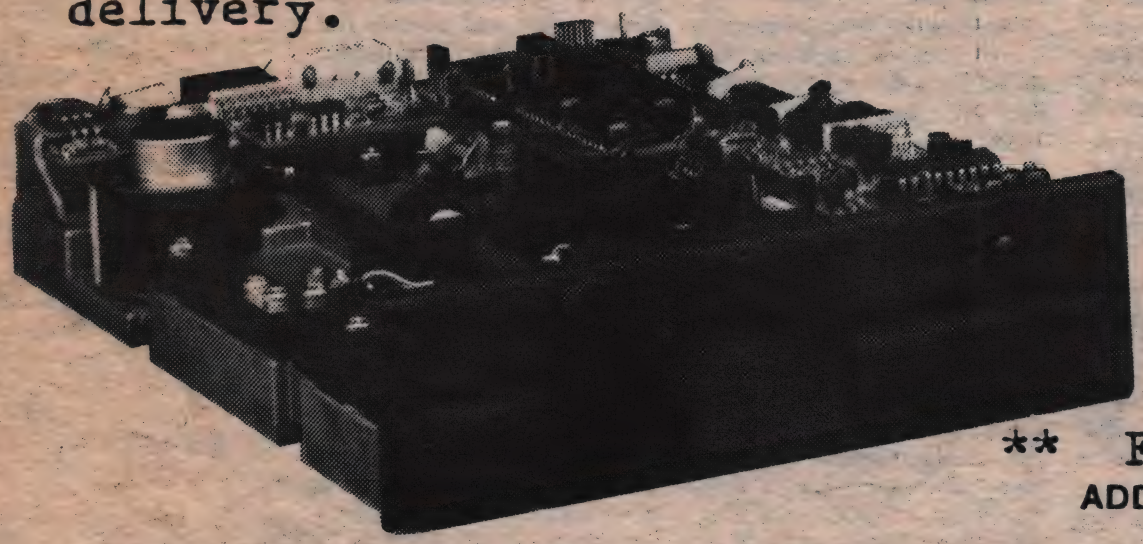

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Integrated Software, Promise And Performance

by Gene Bethold

The software systems that were the most important in the development of personal computer are spreadsheets, databases and word processors. You can sell computers without a language providing you supply these three vital software systems. When the Apple III first came out VisiCalc was about the only program you could run on it but that was enough to make it attractive to many buyers. Like any other successful thing people wanted more of a good thing. They wanted to use the information derived from a spreadsheet in documents prepared on a word processor. They also wanted to store their spreadsheet data in a database so that related information could be accessed, sorted and printed in relation to other similar information.

The first attempt to make all this possible resulted in an exchange format called DIF (Data Exchange Format). The purpose of DIF was to convert data from VisiCalc and other programs into a format transportable to other systems. DIF was a positive improvement but it required people who know how to use it and how to integrate it into software. It was not yet "User Friendly."

The first integrated software system which combined elements of spreadsheets, business graphics, database and some word processing capability into one system was Lotus 1,2,3. Lotus is mainly a spreadsheet and graphics combination, but it does include many built-in functions and features, plus the ability to use color. Lotus became a de facto standard for similar software. Many other programs released did more or less the same thing.

As far as they go, Lotus, SuperCalc III, Multiplan, and others can not be considered integrated software systems since they lack one or more elements that must be included to achieve true integration. For example: A user is preparing a long proposal with a lot of text. In the middle of the proposal a spreadsheet is required to show relationships. Later on graphs, histograms and pie charts are needed to illustrate various parts of the proposal. A PERT Chart is required at the end and a presentation of a proposed parts list and financial statement of the company. A truly integrated software system would be able to produce such a proposal without leaving the software package and using one single database of information. This is the promise of software integration.

The second generation of integrated software systems including Knowledgeman, Symphony, Jazz, Framework, Enable, SuperCalc III, Multiplan, Aura all extend the capabilities of integration beyond the original programs. Knowledgeman does it by adding modules to expand the system as required by the needs of the user. Aura permits the user pick and choose among many methods of using the system. Aura can be customized by the user to fit into habits developed using earlier programs. The user can do spreadsheets like Multiplan, word processing like WordStar and database management like dBase II.

The question arises "How much integration is good?" Does it put the user into a straightjacket and close other options? It is true that a dedicated integrated system user loses touch with the software world in an attempt to master his system. This is essential because none of these integrated systems are easy. You must apply yourself to learn how to use your software and you do not stop learning. The casual user may only learn just enough to do the job at hand, but few can resist the urge to "poke around" and learn how to do new things.

What happens when new systems come out? How do you wean away users from the system they have mastered with so much pain? You don't. That is the problem faced by the software industry. The Lotus 1,2,3 users have learned their system and it produces for them. True, it does not do everything, but it is a productivity tool that they have finally mastered. Now Symphony comes along and Lotus wants to sell it into their customer base. How many of the Lotus 1,2,3 owners want to upgrade? A lot depends on the answer for now and the future of the personal computer industry.

The Macintosh computer is an integrated hardware system incorporating integrated firmware, yet now systems like Enable extend the concept to make it more useful to "the rest of us" as Apple likes to call Macintosh owners. I believe that this will lead to the future of software integration a synergistic relationship between computer and its software resulting in a system that will do the things described at the start of this article.

It will surprise most people to learn that the ultimate integrated software system has already been developed and has been in use for many years! It is called UNIX. ●

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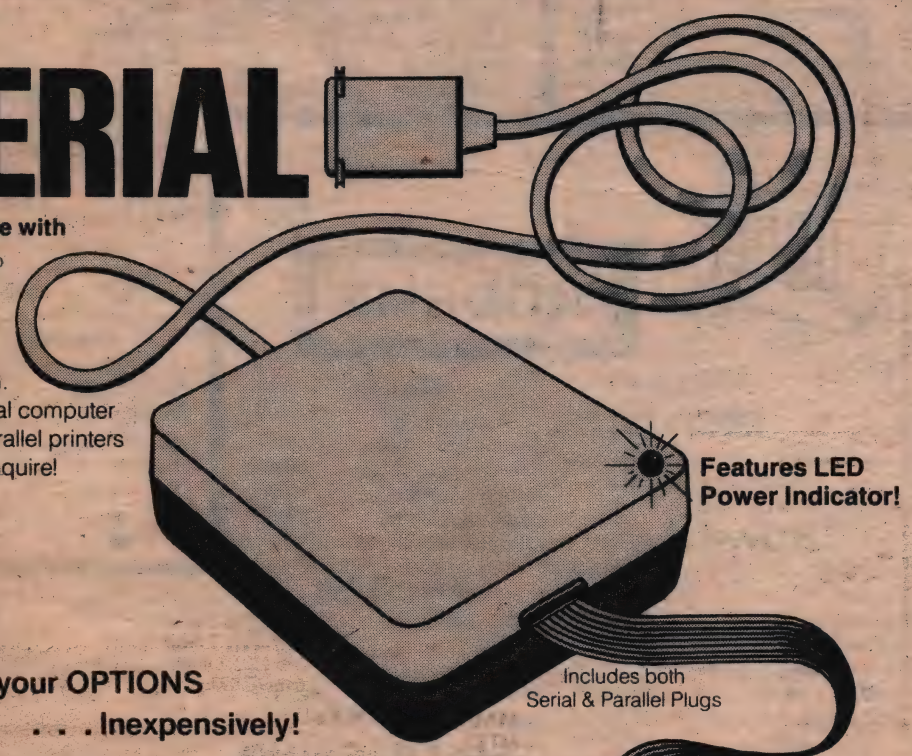

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The Hitchhiker's Guide To The Galaxy From Infocom

by Barbara Nathan

With your "Don't Panic" button affixed firmly to your shirt and your towel in hand, get ready to tour the universe as Arthur Dent... bold hero of **"The Hitchhiker's Guide To The Galaxy"** an interactive science fiction novel from Infocom, by Douglas Adams and Steve Meretzky.

"The Hitchiker's Guide To The Galaxy", first a radio show, next a novel, then a British TV series (aired in America on PBS-TV) and now an interactive fiction novel, was the creation of Douglas Adams, a British science fiction author.

Hitchhiker's is a difficult game. As I write this, Infocom's InvisiClues have not yet been released. Complex games of this type can take weeks of play, until a true familiarity with them is obtained. The comments that I offer here should be considered "first time around" reactions.

The game is incorrectly rated. This is not, a "Standard Level" game. Infocom rates each game they publish, the ratings range from Junior to Expert. "Standard" represents the next to easiest difficulty level. Hitchhiker' s is a difficult game, even for the experienced Infocom game player, and a rating of "Advanced" (the notch below Expert) would be a more reasonable appraisal of its difficulty level. Familiarity with some of Infocom 's earlier games, will make this one easier to tackle.

The game has a linear structure. (You proceed from beginning to end, by a series of moves that must follow in a certain order.) Many adventure games permit "looping", going from place to place at random, to complete tasks. Although this linear structure presents less of a challenge for the expert, it is much less confusing for the beginner. There are no long hallways to get lost in, and no complicated maps are needed, to successfully complete the game.

The Hitchhiker' s Guide To The Galaxy (the game) is based on the novel of the same name. Particularly in the early stages of the game, it is mandatory to have the book at your side. Although in the opening statement of the introduction to the game, you are told that everything you need to know about playing **The Hitchhiker' s Guide To The Galaxy** is contained in the pages of your manual, the final paragraph of the opening statement does admit that a familiarity with the story will make the earlier puzzles easier. I found that the book was helpful throughout, and kept it by my side at all times while playing.

As mentioned above, this

Continued On Page 65

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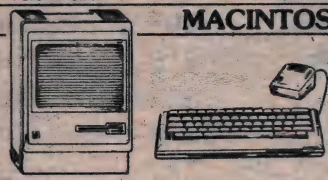

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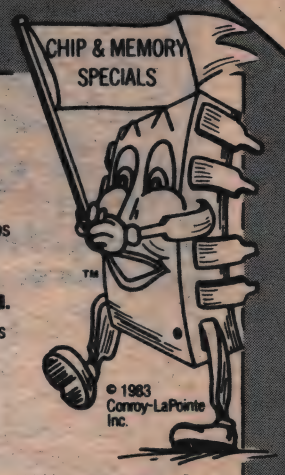

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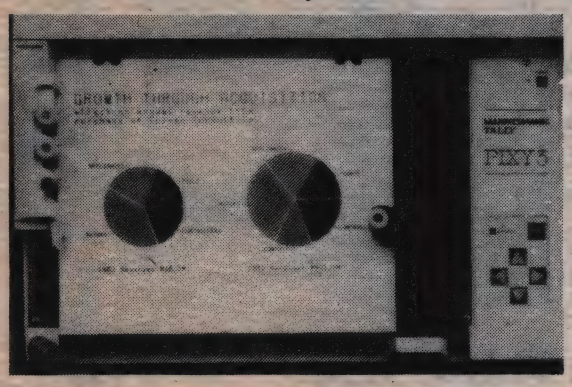

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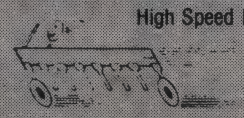

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SN7402N	14	.29	SN7476N	16	.39	SN74161N	16	.59
SN7403N	14	.29	SN7479N	14	4.95	SN74162N	16	.59
SN7404N	14	.35	SN7480N	14	.89	SN74163N	16	.59
SN7405N	14	.49	SN7482N	14	1.49	SN74164N	14	.69
SN7406N	14	.59	SN7483N	16	.55	SN74165N	16	.69
SN7407N	14	.59	SN7485N	16	.59	SN74166N	16	.69
SN7408N	14	.29	SN7486N	14	.39	SN74167N	16	2.95
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SN7410N	14	.29	SN7490N	14	.49	SN74172N	24	4.95
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SN7412N	14	.49	SN7492N	14	.45	SN74174N	16	.59
SN7413N	14	.39	SN7493N	14	.45	SN74175N	16	.59
SN7414N	14	.49	SN7494N	14	.89	SN74176N	14	.79
SN7416N	14	.49	SN7495N	14	.49	SN74177N	14	.79
SN7417N	14	.59	SN7496N	16	.49	SN74179N	16	1.49
SN7420N	14	.19	SN7497N	16	3.25	SN74180N	14	.69
SN7421N	14	.59	SN74100N	24	1.95	SN74181N	24	1.95
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SN7423N	16	.69	SN74107N	14	.29	SN74184N	16	2.29
SN7425N	14	.39	SN74109N	16	.39	SN74185N	16	2.29
SN7426N	14	.39	SN74116N	24	1.49	SN74190N	16	.69
SN7427N	14	.25	SN74121N	14	.45	SN74191N	16	.69
SN7428N	14	.59	SN74122N	14	.69	SN74192N	16	.69
SN7430N	14	.35	SN74123N	16	.55	SN74193N	16	.69
SN7432N	14	.39	SN74125N	14	.49	SN74194N	16	.69
SN7433N	14	.49	SN74126N	14	.49	SN74195N	16	.49
SN7437N	14	.25	SN74128N	14	.79	SN74196N	14	.75
SN7438N	14	.49	SN74132N	14	.59	SN74197N	14	.75
SN7439N	14	.79	SN74136N	14	.69	SN74198N	24	1.19
SN7440N	14	.19	SN74141N	16	.89	SN74199N	24	1.19
SN7441N	16	.89	SN74142N	16	3.95	SN74221N	16	1.19
SN7442N	16	.45	SN74143N	24	3.95	SN74251N	16	.79
SN7443N	16	1.25	SN74144N	24	3.95	SN74273N	20	1.95
SN7444N	16	1.25	SN74145N	16	.65	SN74276N	20	2.49
SN7445N	16	.69	SN74147N	16	1.29	SN74279N	16	.79
SN7446N	16	.75	SN74148N	16	.89	SN74283N	16	1.39
SN7447N	16	.75	SN74150N	24	1.49	SN74284N	16	2.95
SN7448N	16	.75	SN74151N	16	.49	SN74285N	16	2.95
SN7454N	14	.19	SN74152N	14	.49	SN74365N	16	.55
SN7459N	14	.35	SN74153N	16	.99	SN74366N	16	.55
SN7460N	14	.39	SN74154N	24	1.49	SN74367N	16	.55
SN7470N	14	.39	SN74155N	16	.49	SN74368N	16	.55
SN7472N	14	.39	SN74156N	16	.59	SN74390N	16	1.49
SN7473N	14	.39	SN74157N	16	.49	SN74393N	14	1.49

74LS

74LS00	14	.29	74LS132	14	.65	74LS244	20	1.29
74LS01	14	.29	74LS133	16	.59	74LS245	20	1.49
74LS02	14	.35	74LS136	14	.39	74LS251	16	.59
74LS03	14	.29	74LS138	16	.59	74LS253	16	.59
74LS04	14	.39	74LS139	16	.59	74LS257	16	.59
74LS05	14	.35	74LS145	16	1.19	74LS258	16	.59
74LS08	14	.35	74LS147	16	1.95	74LS260	14	.59
74LS09	14	.35	74LS148	16	1.79	74LS266	14	.49
74LS10	14	.35	74LS151	16	.59	74LS273	20	1.49
74LS11	14	.35	74LS153	16	.59	74LS279	16	.49
74LS14	14	.59	74LS154	24	1.49	74LS280	14	1.95
74LS15	14	.35	74LS155	16	.69	74LS299	20	2.95
74LS20	14	.29	74LS156	16	.69	74LS322	20	3.95
74LS21	14	.35	74LS157	16	.69	74LS323	20	3.95
74LS26	14	.29	74LS158	16	.59	74LS347	16	.79
74LS27	14	.35	74LS160	16	.69	74LS353	16	1.09
74LS28	14	.39	74LS161	16	.69	74LS364	20	1.95
74LS30	14	.39	74LS162	16	.69	74LS365	16	.49
74LS32	14	.39	74LS163	16	.69	74LS366	16	.49
74LS37	14	.35	74LS164	14	.89	74LS367	16	.49
74LS38	14	.39	74LS165	16	.89	74LS368	16	.49
74LS42	16	.49	74LS168	16	1.19	74LS373	20	1.49
74LS47	16	.89	74LS169	16	1.49	74LS374	20	1.49
74LS51	14	.29	74LS170	16	1.49	74LS375	16	.69
74LS73	14	.39	74LS173	16	.69	74LS386	14	.39
74LS74	14	.49	74LS174	16	.69	74LS393	14	1.19
74LS75	16	.45	74LS175	16	.69	74LS399	16	1.49
74LS76	16	.39	74LS181	24	2.49	74LS490	16	1.95
74LS85	16	.89	74LS190	16	.79	74LS533	20	1.95
74LS86	14	.39	74LS191	16	.89	74LS534	20	1.95
74LS90	14	.55	74LS192	16	.79	74LS540	20	1.49
74LS92	14	.55	74LS193	16	.89	74LS541	20	1.49
74LS93	14	.59	74LS194	16	.69	74LS640	20	2.19
74LS96	16	.89	74LS195	16	.59	74LS641	20	2.19
74LS107	14	.39	74LS196	14	.89	74LS644	20	2.19
74LS109	16	.39	74LS197	14	.89	74LS645	20	2.19
74LS112	16	.45	74LS221	16	1.09	74LS670	16	1.49
74LS114	14	.39	74LS240	20	1.09	74LS688	20	2.95
74LS122	14	.49	74LS241	20	.99	81LS95	20	1.49
74LS123	16	.79	74LS243	14	1.09	81LS96	20	1.49
74LS125	14	.59				81LS97	20	1.49
74LS126	14	.59				81LS98	20	1.49

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74S00	14	.35	74S114	14	.55	74S241	20	1.95
74S02	14	.35	74S124	16	2.75	74S242	14	2.19
74S03	14	.35	74S132	14	1.89	74S243	14	2.19
74S04	14	.45	74S133	16	.45	74S244	20	2.19
74S05	14	.45	74S135	16	.89	74S251	16	.99
74S08	14	.45	74S136	14	1.39	74S253	16	.99
74S09	14	.39	74S138	16	.89	74S257	16	.99
74S10	14	.35	74S139	16	.89	74S258	16	.99
74S11	14	.35	74S140	14	.69	74S260	14	.79
74S15	14	.35	74S151	16	.99	74S273	20	2.39
74S20	14	.35	74S153	16	.99	74S280	14	1.89
74S22	14	.35	74S157	16	.99	74S287*	16	1.79
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74S32	14	.45	74S160	16	2.29	74S299	20	5.95
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CA3046N	14	.99	CA3083N	16	1.15	CA3160H		1.79
CA3059N	14	2.95	CA3086N	14	.85	CA3160E	8	1.49
CA3060N	16	2.95	CA3089N	16	1.95	CA3161E	16	1.79
CA3065E	14	1.49	CA3096N	16	1.75	CA3162E	16	6.95
CA3080E	8	.99				CA3189E	16	2.79
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CD4002	14	.29	CD4042	16	.69	CD4506	16	1.29
CD4006	14	.89	CD4043	16	.79	CD4507	14	1.19
CD4007	14	.29	CD4044	16	.79	CD4508	24	1.95
CD4008	16	.89	CD4046	16	.89	CD4510	16	.85
CD4009	16	.59	CD4047	14	.89	CD4511	16	.85
CD4010	16	.49	CD4048	16	.59	CD4512	16	.85
CD4011	14	.29	CD4049	16	.39	CD4514	24	1.49
CD4012	14	.29	CD4050	16	.39	CD4515	24	1.49
CD4013	14	.39	CD4051	16	.79	CD4516	16	.89
CD4014	16	.89	CD4052	16	.89	CD4518	16	.89
CD4015	16	.39	CD4053	16	.79	CD4519	16	.59
CD4016	14	.49	CD4056	16	2.95	CD4520	16	.89
CD4017	16	.79	CD4059	24	3.95	CD4526	16	1.19
CD4018	16	.79	CD4060	16	.89	CD4528	16	1.19
CD4019	16	.49	CD4066	14	.45	CD4529	16	1.69
CD4020	16	.75	CD4068	14	.39	CD4531	16	.89
CD4021	16	.75	CD4069	14	.35	CD4538	16	1.49
CD4022	16	.75	CD4070	14	.29	CD4541	14	1.49
CD4023	14	.29	CD4071	14	.29	CD4543	16	1.19
CD4024	14	.69	CD4072	14	.29	CD4562	14	6.95
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CD4026	16	1.59	CD4077	14	.35	CD4583	16	2.49
CD4027	16	.45	CD4078	14	.49	CD4584	14	.59
CD4028	16	.69	CD4081	14	.29	CD4723	16	1.19
CD4029	16	.79	CD4093	14	.49	CD4724	16	1.19
CD4030	14	.39	CD4094	16	1.95	MC14410	16	8.95
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74ALS02	14	Quad 2-Input NOR Gate	.59
74ALS04	14	Hex Inverter	.59
74ALS08	14	Quad 2-Input AND Gate	.59
74ALS10	14	Triple 3-Input NAND Gate	.59
74ALS30	14	8-Input NAND Gate	.59
74ALS32	14	Quad 2-Input OR Gate	.65
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74ALS245	20	Octal Bus Transceiver (Non-Inv.)	2.59
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Z80-DART	40	Dual Asynchronous Rec./Trans.	8.95
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8286	20	Octal Bus Transceiver	6.49 ~~7.95~~
8287	20	Octal Bus. Transceiver (Inverted)	6.49 ~~7.95~~
8288	20	Bus Controller	14.95 ~~19.95~~
8303	20	8-Bit Tri-State Bi-Directional Trans.	3.49
8304	20	8-Bit Bi-Directional Receiver	3.49
8310	20	Octal Latched Peripheral Driver	3.95
8741	40	8-Bit Univ. Peripheral Interface	19.95 ~~29.95~~
8748	40	HMOS EPROM MPU	19.95 ~~39.95~~
8749	40	MPU 8-Bit (EPROM Version of 8049)	24.95 ~~39.95~~
8755	40	16K EPROM with I/O	39.95
80186-6	68	High Integration 16-Bit MPU	99.95
80188	68	High Integra. 16-Bit MPU (8-Bit Data Bus)	89.95
SPECIAL FUNCTION			
DS0026CN	8	Dual MOS Clock Driver (5MHz)	1.95
INS2651	28	Communication Chip	7.95
MC3470P	18	Floppy Disk Read Amp System	4.95
MM5321N	16	TV Camera Sync. Generator	9.95
MM54240N	24	Asynchronous Transmitter/Receiver	5.95
MM58167AN	24	Microprocessor Real Time Clock	8.95
MM58174AN	16	Micro. Compatible Time Clock	8.95
MM5369AA/N	8	Prog. Oscillator/Divider (60Hz)	1.79
MM5369EST	8	Prog. Oscillator/Divider (100Hz)	1.95

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DYNAMIC RAMS

Part No.	Pins	Function	Price
1103	18	1024x1 (300ns)	.99
4027	16	4096x1 (250ns)	1.49
4116N-15	16	16,384x1 (150ns)	1.39 — 8/10.95
4116N-20	16	16,384x1 (200ns)	.79-8/6.29 ~~1.15-8/8.95~~
4116N 25	16	16,384x1 (250ns)	.69-8/5.49 ~~.89-8/6.95~~
4164N-150	16	65,536x1 (150ns)	3.95-8/31.49 ~~5.19-8/40.95~~
4164N-200	16	65,536x1 (200ns)	3.75-8/29.95 ~~4.95-8/38.95~~
MM5261	18	1024x1 (300ns)	.35 — 8/1.95
MM5262	22	2048x1 (365ns)	.35 — 8/1.95
MM5270	18	4096x1 (250ns) MK4096	4.95
MM5280	22	4096x1 (200ns) 2107	3.95
MM5298-3	16	8192x1 (200ns)	.59
41256-150	16	262,144x1 (150ns)	15.95 ~~34.95~~
41256-200	16	262,144x1 (200ns)	13.95 ~~31.95~~
48128	16	131,072x1 (250ns)	24.95
STATIC RAMS			
2101	22	256x4 (450ns) 8101	1.95
2102	16	1024x1 (350ns)	.89
2102-2L	16	1024x1 (250ns) L.P. (91L02)	1.49
2111	18	256x4 (450ns) 8111	2.49
2112	16	256x4 (450ns) MOS	2.49
2114N	18	1024x4 (450ns)	1.29 — 8/9.95
2114N-L	18	1024x4 (450ns) L.P.	1.65 — 8/12.95
2114N-2	18	1024x4 (200ns)	1.39 — 8/10.95
2114N-2L	18	1024x4 (200ns) L.P.	1.69 — 8/13.49
2147HN	18	4096x1 (70ns)	4.49
2148HN	18	1024x4 (70ns)	4.95
TMS4045	18	1024x4 (450ns)	3.95
TMS40L47-45	20	1024x4 (450ns)	1.95
5101	22	256x4 (450ns) CMOS	3.95
MM5257	18	4096x1 (450ns) 4044	4.95
HM6116P-2	24	2048x8 (120ns) CMOS	7.95
HM6116LP-2	24	2048x8 (120ns) L.P. CMOS	8.95
HM6116P-3	24	2048x8 (150ns) CMOS	3.95 ~~4.95~~
HM6116LP-3	24	2048x8 (150ns) L.P. CMOS	4.95 ~~6.49~~
HM6116P-4	24	2048x8 (200ns) CMOS	3.75 ~~4.75~~
HM6116LP-4	24	2048x8 (200ns) L.P. CMOS	4.75 ~~5.49~~
HM6264P-12	28	8192x8 (120ns) CMOS	19.95 ~~37.95~~
HM6264LP-12	28	8192x8 (120ns) L.P. CMOS	21.95 ~~39.95~~
HM6264P-15	28	8192x8 (150ns) CMOS	16.95 ~~34.95~~
HM6264LP-15	28	8192x8 (150ns) L.P. CMOS	17.95 ~~37.95~~
27LS00	16	256x1 (80ns) L.P.	3.95
7489	16	16x4 (50ns) 3101	2.25
74C921	18	256x4 (250ns) CMOS	5.95
74C930	18	1024x1 (250ns) CMOS (6518)	5.95
74S189	16	16x4 (35ns) 93405	2.95
74S289	16	16x4 (35ns) 3101	2.95
82S10	16	1024x1 (50ns) O.C. (93415)	3.95
82S25	16	16x4 (50ns) O.C. (74S289)	2.25
PROMS/EPROMS			
1702A	24	256x8 (1µs)	3.95
2708	24	1024x8 (450ns)	3.95
TMS2516	24	2048x8 (450ns) 2716	4.95
TMS2532	24	4096x8 (450ns) NMC2532	5.49
TMS2564	28	8192x8 (450ns)	10.95
TMS2716	24	2048x8 (450ns) 3 voltage	7.95
2716	24	2048x8 (450ns)	3.95
27C16	24	2048x8 CMOS	12.95 ~~14.95~~
2716-1	24	2048x8 (350ns)	5.49
27160-5	24	2048x8 (550ns)	3.75
2732	24	4096x8 (450ns)	4.95
2732A-20	24	4096x8 (200ns) 21V	11.49
2732A-25	24	4096x8 (250ns) 21V	7.19
2732A-45	24	4096x8 (450ns) 21V	4.95 ~~6.49~~
27C32	24	4096x8 CMOS	14.95 ~~19.95~~
27C32A-30	24	4096x8 (300ns) 21V (CMOS)	22.95
2764-20	28	8192x8 (200ns) 21V	9.95 ~~14.95~~
2764-25	28	8192x8 (250ns) 21V	7.19
2764-45	28	8192x8 (450ns) 21V	6.49
27C64	28	8192x8 CMOS 21V	14.95 ~~22.95~~
MCM68764	24	8192x8 (450ns) 21V	14.95 ~~24.95~~
27128-25	28	16,384x8 (250ns) 128K 21V	12.95 ~~21.95~~
27256-25	28	32,768x8 (250ns) 256K (14V)	49.95 ~~99.95~~
74S188	16	32x8 PROM O.C. (6330-1)	1.75
74S287	16	256x4 PROM T.S. (6301-1)	1.79
74S288	16	32x8 PROM T.S. (6331-1)	1.79
74S387	16	256x4 PROM O.C. (6300-1)	1.95
74S471	20	256x8 PROM T.S. (6309-1)	4.95
74S472	20	512x8 PROM T.S. (6349-1)	4.95
74S473	20	512x8 PROM O.C. (6348)	4.95
74S474	24	512x8 PROM T.S. (DM87S296N)	4.95
74S475	24	512x8 PROM O.C. (6340)	4.95
74S476	18	1024x4 PROM T.S.	6.95
74S478	24	1024x8 PROM T.S.	9.95
74S570	16	512x4 PROM O.C. (6305)	2.95
74S571	16	512x4 PROM T.S. (6306)	2.95
74S572	18	1024x4 PROM O.C. (6352)	4.95
74S573	18	1024x4 PROM T.S. (82S137)	4.95
82S23	16	32x8 PROM O.C. (27S18)	2.95
82S115	24	512x8 PROM T.S. (27S15)	9.95
82S123	16	32x8 PROM T.S. (27S19)	2.95
82S126	16	256x4 PROM O.C. (27S20)	2.95
82S129	16	256x4 PROM T.S. (27S21)	2.95
82S130	16	512x4 PROM O.C. (27S12)	3.95
82S185	18	2048x4 PROM T.S. (TBP24S81)	9.95
82S191	24	2048x8 (80ns)	14.95
DM87S181N	24	1024x8 PROM T.S. (82S181)	9.95
DM87S184N	18	2048x4 PROM O.C. (82S184)	9.95
DM87S185N	18	2048x4 PROM T.S. (82S185)	9.95
DM87S191N	24	2048x8 PROM T.S. (82S191)	14.95
DATA ACQUISITION			
DC10		Mostek DC/DC Converter +5V to −9V	2.95
ADC0801	20	8-Bit A/D Converter (1/4LSB)	14.95
ADC0803	20	8-Bit A/D Converter (±1/2LSB)	4.95
ADC0804	20	8-Bit A/D Converter (1LSB)	3.49
ADC0808	28	8-Bit A/D Conv. w/8-Channel Analog	9.95
ADC0809	28	8-Bit A/D Converter (8-Ch. Multi.)	4.49
ADC0816	40	8-Bit A/D Conv. w/16-Channel Analog	14.95
ADC0817	40	8-Bit A/D Converter (16-Ch. Multi.)	9.49
DAC0806	16	8-Bit D/A Converter (0.78% Lin.)	1.95
DAC0807	16	8-Bit D/A Converter (MC1408-7)	1.49
DAC0808	16	8-Bit D/A Converter (MC1408-8)	2.25
DAC0830	20	8-Bit Up D/A Conv. (.05% Lin.)	5.95
DAC0831	20	8-Bit Up D/A Conv. (.10% Lin.)	4.49
DAC1000	24	10-Bit D/A Conv. Micro. Comp. (0.05%)	7.95
DAC1008	20	10-Bit D/A Conv. Micro. Comp. (0.20%)	6.95
DAC1020	16	10-Bit D/A Conv. (0.05% Lin.)	7.95
DAC1022	16	10-Bit D/A Conv. (0.20% lin.)	5.95
DAC1222	18	12-Bit D/A Conv. (0.20% Lin.)	6.95
DAC1230	20	12-Bit Up D/A Conv. (.05% Lin.)	14.95
DAC1231	20	12-Bit Up D/A Conv. (.10% Lin.)	13.95
AY-5-1013A	40	30K Baud UART (TR1602)	3.95

Low Profile (Tin) Sockets

Part No.	1-9	10-99	100-up
8 pin LP	.16	.14	.13
14 pin LP	.17	.15	.14
16 pin LP	.19	.17	.16
18 pin LP	.26	.24	.23
20 pin LP	.30	.27	.25
22 pin LP	.31	.28	.26
24 pin LP	.33	.30	.28
28 pin LP	.40	.37	.35
40 pin LP	.49	.46	.43

Soldertail (Gold) Standard

Part No.	1-9	10-99	100-up
8 pin SG	.39	.35	.29
14 pin SG	.49	.45	.39
16 pin SG	.55	.49	.45
18 pin SG	.65	.59	.51
20 pin SG	.75	.65	.59
22 pin SG	.79	.69	.65
24 pin SG	.79	.69	.65
28 pin SG	.95	.85	.75
36 pin SG	1.25	1.15	.99
40 pin SG	1.39	1.25	1.15

Wire Wrap Sockets (Gold) Level #3

Part No.	1-9	10-99	100-up
8 pin WW	.55	.49	.45
10 pin WW	.69	.65	.59
14 pin WW	.75	.69	.65
16 pin WW	.79	.72	.65
18 pin WW	.95	.85	.75
20 pin WW	1.19	1.09	.95
22 pin WW	1.29	1.19	1.05
24 pin WW	1.35	1.19	1.09
28 pin WW	1.69	1.55	1.39
36 pin WW	1.89	1.79	1.69
40 pin WW	2.29	1.95	1.79

Header Plugs (Gold)

Part No.	1-9	10-99	100-up
14 pin HP	.65	.59	.55
16 pin HP	.69	.65	.59
24 pin HP	1.15	.99	.89

Header Covers

Part No.	1-9	10-99	100-up
14 pin HC	.15	.13	.12
16 pin HC	.19	.17	.15
24 pin HC	.29	.25	.22

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DISK CONTROLLERS

Part No.	Pins	Function	Price
INS1771-1	40	Single Density	16.95
FD1791	40	Single/Dual Density (Inv.)	24.95
FD1793	40	Single/Double Density (True)	26.95
FD1795	40	Dual Density/Side Select (Inv.)	26.95
FD1797	40	Dual Density/Side Select (True)	29.95
WD2791	40	Single/Double Density (Inv.)	39.95
WD2793	40	Single/Double Density (True)	39.95
WD2797	40	Dual Density/Side Select (True)	39.95

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INTERSIL

Part No.	Pins	Function	Price
7045IPI	28	CMOS Precision Timer	14.95
7045EV/Kit	28	Stopwatch Chip, XTL (Evaluation Kit)	19.95
7106CPL	40	3½ Digit A/D (LCD Drive)	10.49
FE0202D	40	4 Digit LCD Display for 7211IPL & 7211MIPL	14.95
FE0203D	40	3½ Digit LCD Display for 7106 & 7116	14.95
7106EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7107CPL	40	3½ Digit A/D (LED Drive)	10.95
7107EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7116CPL	40	3½ Digit A/D LCD Dis. HLD	10.95
7201IUS		Low Battery Volt. Indicator	2.25
7205IPG	24	CMOS LED Stopwatch/Timer	14.95
7205EV/Kit	24	Stopwatch Chip, XTL (Evaluation Kit)	16.95
7206CJPE	16	Tone Generator	4.95
7206CEV/Kit	16	Tone Generator Chip, XTL (Evaluation Kit)	7.95
7207AIPD	14	Oscillator Controller	5.95
7207AEV/Kit	14	Freq. Counter Chip, XTL (Evaluation Kit)	8.49
7211IPL	40	4 Digit LCD Display Decoder/Driver (TTL compatible)	7.95
7211MIPL	40	4 Digit LCD Display Decoder/Driver (Microproc. compat.)	8.95
7215IPG	24	4 Func. CMOS Stopwatch CKT	16.95
7215EV/Kit	24	4 Func. Stopwatch Chip, XTL (Evaluation Kit)	19.49
7216AIJI	28	8 Digit Univ. Counter C.A.	31.49
7216DIPI	28	8 Digit Freq. Counter C.C.	21.49
7217IJI	28	4 Digit LED Up/Down Counter C.A.	10.95
7217AIPI	28	4 Digit LED Up/Down Counter C.C.	9.95
7224IPL	40	LCD 4½ Digit Up Counter DRI.	10.95
7226AEV/Kit	40	5 Function Counter Chip, XTL (Evaluation Kit)	99.95

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74HC High Speed CMOS

74HC00	14	.59	74HC139	16	1.05	74HC245	20	2.59
74HC02	14	.59	74HC147	16	1.29	74HC251	16	.99
74HC03	14	.89	74HC151	16	.99	74HC253	16	1.09
74HC04	14	.59	74HC153	16	1.09	74HC257	16	.99
74HCU04	14	.69	74HC154	24	2.65	74HC259	16	1.69
74HC08	14	.59	74HC157	16	.99	74HC266	14	.89
74HC10	14	.59	74HC158	16	.99	74HC273	20	2.79
74HC11	14	.69	74HC160	16	1.39	74HC280	14	4.59
74HC14	14	.89	74HC161	16	1.39	74HC299	20	5.59
74HC20	14	.59	74HC162	16	1.39	74HC366	16	2.59
74HC27	14	.59	74HC163	16	1.39	74HC367	16	2.59
74HC30	14	.69	74HC164	14	1.35	74HC373	20	2.69
74HC32	14	.79	74HC165	16	2.15	74HC374	20	2.69
74HC42	16	1.09	74HC166	16	2.49	74HC390	16	1.59
74HC51	14	.89	74HC173	16	1.29	74HC393	14	1.59
74HC58	14	.89	74HC174	16	1.09	74HC533	20	2.69
74HC73	14	.79	74HC175	16	1.09	74HC534	20	2.69
74HC74	14	.79	74HC190	16	1.59	74HC595	16	3.19
74HC75	16	.99	74HC191	16	1.59	74HC688	20	3.59
74HC76	16	.79	74HC192	16	1.49	74HC4024	14	1.75
74HC85	16	1.69	74HC193	16	1.49	74HC4040	16	1.49
74HC86	14	.75	74HC194	16	1.19	74HC4060	16	1.49
74HC107	14	.79	74HC195	16	1.19	74HC4075	14	.59
74HC109	16	.79	74HC221	16	2.95	74HC4078	14	.59
74HC112	16	.79	74HC237	16	1.49	74HC4511	16	1.95
74HC123	16	2.29	74HC240	20	2.29	74HC4514	24	4.19
74HC125	14	1.75	74HC241	20	2.29	74HC4538	16	2.59
74HC132	14	1.29	74HC242	14	2.15	74HC4543	16	3.75
74HC137	16	1.59	74HC243	14	2.15			
74HC138	16	1.19	74HC244	20	2.29			

74HCU04 is unbuffered. All others are buffered.

74C—C/MOS

74C00	14	.29	74C107	14	.79	74C240	20	1.95
74C02	14	.35	74C151	16	2.19	74C244	20	1.95
74C04	14	.35	74C154	24	3.25	74C373	20	2.29
74C08	14	.35	74C157	16	1.75	74C374	20	2.29
74C10	14	.35	74C160	16	1.19	74C901	14	.59
74C14	14	.59	74C161	16	1.19	74C902	14	.79
74C20	14	.35	74C162	16	1.19	74C903	14	.59
74C30	14	.35	74C163	16	1.19	74C906	14	.59
74C32	14	.39	74C164	14	1.29	74C907	14	.89
74C42	16	1.19	74C165	16	1.29	74C911	28	8.95
74C48	16	1.79	74C173	16	.89	74C912	28	8.95
74C73	14	.69	74C174	16	1.19	74C915	18	1.19
74C74	14	.59	74C175	16	1.19	74C917	28	8.95
74C85	16	1.39	74C192	16	1.39	74C922	18	4.49
74C86	14	.29	74C193	16	1.39	74C923	20	4.95
74C89	16	5.95	74C195	16	1.29	74C925	16	5.95
74C90	14	1.09	74C221	16	1.75	74C926	18	5.95
74C93	14	1.09				80C95	16	.69
74C95	14	1.19				80C97	16	.69

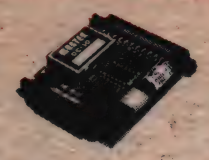
LINEAR

TL071CP	8	.79	LF355N	8	1.09	LM747N	14	.69
TL072CP	8	1.09	LF356N	8	1.09	LM748N	8	.59
TL074CN	14	1.95	LM358N	8	.59	UA760HC		9.95
TL081CP	8	.59	LM359N	14	1.79	LM1456V	8	1.95
TL082CP	8	1.19	LM370N	14	4.95	LM1458CN	8	.59
TL084CN	14	1.95	LM373N	14	4.95	LM1488N	14	.69
LM109K		5.95	LM377N	14	1.95	LM1489N	14	.69
LM301CN	8	.39	LM380CN	8	1.09	LM1496N	14	.99
LM302H		2.49	LM380N	14	.89	LM1605CK		9.95
LM304H		1.95	LM381N	14	1.79	LM1800N	16	2.49
LM305H		.99	LM382N	14	1.49	LM1871N	18	2.95
LM307CN	8	.49	LM384N	14	1.95	LM1872N	18	3.25
LM308CN	8	.69	LM386N-3	8	.89	LM1877N-9	14	2.95
LM309K		1.25	LM387N	8	1.39	LM1889N	18	1.95
LM310CN	8	1.95	LM389N	18	1.19	LM1896N	14	1.59
LM311CN	8	.59	LM391N-80	16	1.19	LM2002T		1.95
LM312H		2.79	LM392N	8	.59	ULN2003A	16	1.49
LM317T		1.19	LM393N	8	.45	XR2206	16	3.95
LM317K		3.49	LF398N	8	3.95	XR2207	14	2.49
LM318CN	8	1.59	LM399H		5.95	XR2208	16	1.79
LM319N	14	1.49	LF412CN	8	1.95	XR2211	14	2.95
LM320K-5		1.35	TL494CN	16	2.79	LM2877P		1.95
LM320K-12		1.35	TL496CP	8	1.59	LM2878P		2.95
LM320K-15		1.35	NE531V	8	1.79	LM2901N	14	.79
LM320K-24		1.35	NE544N	14	1.95	LM2902N	14	.89
LM320T-5		.85	NE550A	14	1.95	LM2907N	14	2.49
LM320T-12		.85	NE555V	8	.35	LM2917N	8	1.95
LM320T-15		.85	XR-L555	8	.69	LM3900N	14	.59
LM320T-24		.85	LM556N	14	.79	LM3905CN	8	1.19
LM322N	14	1.49	NE558N	16	1.59	LM3909N	8	.89
LM323K		4.95	NE564N	16	1.95	LM3914N	18	2.39
LM324N	14	.59	LM565N	14	.99	LM3915N	18	2.39
LM329DZ		.65	LM566CN	8	1.49	LM3916N	18	2.39
LM331N	8	3.95	LM567V	8	.99	RC4136N	14	1.25
LM334Z		1.19	NE570N	16	2.95	RC4151NB	8	1.95
LM335Z		1.29	NE571N	16	2.49	RC4195TK		5.95
LM336Z		1.09	NE592N	14	1.19	LM4250CN	8	1.49
LM337MP		1.15	LM703CN	8	1.49	LM4500A	16	2.95
LM337T		1.89	LM710N	14	.69	NE5532	8	1.69
LM338K		6.95	LM711N	14	.79	NE5534	8	1.39
LM339N	14	.69	LM723N	14	.49	79M05AH		1.29
LM340K-5		1.35	LM733N	14	.89	ICL8038	14	3.95
LM340K-12		1.35	LM739N	14	1.95	LM13080N	8	1.19
LM340K-15		1.35	LM741CN	8	.39	LM13600N	16	1.19
LM340K-24		1.35				76477	28	3.95
LM340T-5		.75				MORE AVAILABLE		
LM340T-12		.75						
LM340T-15		.75						
LM340T-24		.75						
LF347N	14	1.49						
LM348N	14	.89						
LM350K		4.79						
LF351N	8	.59						
LF353N	8	.89						

30003 1982 Nat. Linear Data Book (1952 pgs.) **. $11.95**

Commodore® Accessories

RS232 ADAPTER FOR VIC-20 AND COMMODORE 64



The JE232CM allows connection of standard serial RS232 printers, modems, etc. to your VIC-20 and C-64. A 4-pole switch allows the inversion of the 4 control lines. Complete installation and operation instructions included.

• Plugs into User Port • Provides Standard RS232 signal levels • Uses 6 signals (Transmit, Receive, Clear to Send, Request to Send, Data Terminal Ready, Data Set Ready).

JE232CM $39.95

VOICE SYNTHESIZER FOR APPLE AND COMMODORE

• Over 250 word vocabulary-affixes allow the formation of more than 500 words • Built-in amplifier, speaker, volume control, and audio jack • Recreates a clear, natural male voice • Plug-in user ready with documentation and sample software • Case size: 7¼"L x 3¼"W x 1-3/8"H

APPLICATIONS: • Security Warning • Teaching • Instrumentation • Telecommunication • Handicap Aid • Games

Part No.	Description	Price
JE520CM	For Commodore 64 & VIC-20	$114.95
JE520AP	For Apple II, II+, and *IIe*	$149.95

All Major Manufacturers-Not Micron

Computer Memory Expansion Kits

IBM PC, PC XT and Compatibles

Most of the popular Memory Boards (e.g. Quadram™ Expansion Boards) allow you to add an additional 64K, 128K, 192K or 256K. The IBM64K Kit will populate these boards in 64K byte increments. The Kit is simple to install—just insert the 9 - 64K RAM chips in the provided sockets and set the 2 groups of switches. Complete conversion documentation included.

IBM64K (Nine 200ns 64K RAMs). $33.49

IBM PC AT

Each kit comes complete with nine 128K dynamic RAMs and documentation for conversion.

IBM128K (Nine 250ns 128K RAMs). $199.95

APPLE *IIe*

Extended 80-Column/64K RAM Card. Expands memory by 64K to give 128K when used with programs like VisiCalc™. Fully assembled and tested.

JE864. . . . . $99.95

TRS-80 MODEL I, III

Each Kit comes complete with eight MM5290 (UPD416/4116) 16K Dynamic RAMs and documentation for conversion. Model 1: 16K equipped with Expansion Interface can be expanded to 48K with 2 Kits. Model III: Can be expanded from 16K to 48K using 2 Kits. Each Kit will expand computer by 16K increments.

TRS-16K3 200ns (Model III). $6.29
TRS-16K4 250ns (Model 1). $5.49

TRS-80 MODEL IV & 4P

Easy to install Kit comes complete with 8 ea. 4164N-20 (200ns) 64K Dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

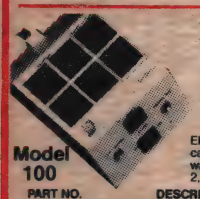
TRS-64K-2. . . . . $29.95
(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). $49.95
(8 - 4164's with PAL Chip to expand from 64K to 128K)

TRS-80 COLOR AND COLOR II

Easy to install Kit comes complete with 8 each 4164N-20 (200ns) 64K Dynamic RAMs and documentation for conversion. Converts TRS-80 Color Computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 Color Computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K-2. . . . . $29.95



PTI INDUSTRIES

PROTECT YOURSELF...

DATASHIELD® Surge Protector

Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. 6-mo. warranty. Power dissipation (100 microseconds): 2,000,000 watts

PART NO.	DESCRIPTION	PRICE
MODEL 75	4 Sockets, On/Off Switch.	$49.95
MODEL 85	6 Sock., Super Filters, On/Off Switch.	$59.95
MODEL 100	6 Sock., Super Filters, Low Volt. Alarm.	$69.95
MODEL 110AMS	6 Sockets, Super Filters, Auto. Master Switch.	$99.95

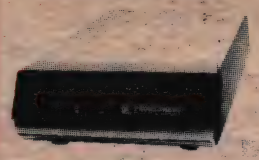
DATASHIELD® Back-Up Power Source

Protect your computer from black-outs, brown-outs, power surges and line noise. PTI's PC200 is designed for PCs with floppy disk memory, the XT300 for hard disk memory and the AT800 for multi-user systems. A typical compatible PC for each of these standbys will be supported for 15 to 25 minutes after power is lost. Weight (PC200: 24 lbs.) – (XT300: 37.5 lbs.) – (AT500: 83 lbs.) – (AT800: 83 lbs.)

PC200 (200 Watt Rating). $299.95
XT300 (300 Watt Rating). $399.95
AT500 (500 Watt Rating). $699.95
AT800 (800 Watt Rating). $799.95

ProModem 1200 and Options

PROMETHEUS



Intelligent 300/1200 Baud Telephone Modem with Real Time Clock/Calendar

The ProModem™ is a Bell 212A (300/1200 baud) intelligent stand-alone modem • Full featured expandable modem • Standard features include Auto Answer and Auto Dial, Help Commands, Programmable Intelligent Dialing, Touch Tone™ and Pulse Dialing & More • Hayes command set compatible plus an additional extended command set • Shown w/alphanumeric display option.

Part No.	Description	Price
PM1200	RS-232 Stand Alone Unit.	$349.95
PM1200A	Apple II, II+ and *IIe* Internal Unit.	$369.95
PM1200B	IBM PC and Compatible Internal Unit.	$269.95
PM1200BS	IBM PC & Comp. Int. Unit w/ProCom Software.	$319.95
MAC PAC	Macintosh Package. (Includes PM1200, Cable, & ProCom Software)	$399.95

OPTIONS FOR ProModem 1200

PM-COM	(ProCom Communication Software). Please specify Operating System.	$79.95
PM-OP	(Options Processor).	$79.95
PMO-16K	(Options Processor Memory – 16K).	$10.95
PMO-32K	(Options Processor Memory – 32K).	$20.95
PMO-64K	(Options Processor Memory – 64K).	$39.95
PM-ALP	(Alphanumeric Display).	$79.95
PM-Special	(Includes Options Processor, 64K Memory and Alphanumeric Display).	$189.95

KEYBOARDS

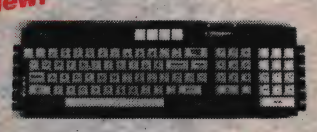
13⅛"L x 4¼"W x ¾"H

Mitsumi 54-Key Unencoded All-Purpose Keyboard

• SPST keyswitches • 20 pin ribbon cable connection • Low profile keys • Features: cursor controls, control, caps (lock), function, enter and shift keys • Color (keycaps): grey • Wt.: 1 lb. • Pinout included

KB54. . . . . $14.95

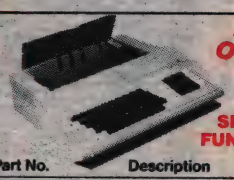
New!



82-Key ASCII Cherry Keyboard

• 7-bit parallel ASCII • 11-key numeric keypad • Cursor keypad • SPST mechanical keyswitches • 4 illuminated keys • 26-pin header connector Color: white • Size: 18"L x 6¼"W x 1¼"H • Spec included

KB8201. . . . *(1700 avail.)*. . . . $29.95



Apple Owners!

SPECIAL FUNCTIONS!

Apple Keyboard and Case for Apple II and II+

Keyboard: • 68 keys • 15-key keypad • Direct connection with 16-pin ribbon connector • 26 special functions • Size: 14½"L x 5½"W x 1½"H

Case: Accommodates KB-A68 • Pop-up lid for easy access • Fits power supply and motherboard too • Size: 15½"W x 18"D x 4¼"H

Part No.	Description	Price
KB-EA1	Apple Keyboard and Case (pictured above).	$134.95
KB-A68	68-Key Apple Keyboard only.	$ 79.95
EAEC-1	Expanded Apple Enclosure Case only.	$ 59.95

POWER SUPPLIES

Power/Mate Corp. REGULATED POWER SUPPLY

• Input: 105-125/210-250 VAC at 47-63 Hz • Line regulation: ±0.05% • Three mounting surfaces • Overvoltage protection • UL recognized • CSA certified

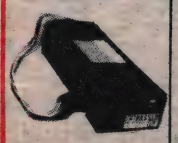
Part No.	Output	Size	Weight	Price
EMA5/6B	5V@3A/6V@2.5A	4⅞"L x 4"W x 2⅛"H	2 lbs.	$29.95
EMA5/6C	5V@6A/6V@5A	5⅝"L x 4⅞"W x 2⅛"H	4 lbs.	$39.95

KEPCO/TDK 4-OUTPUT SWITCHING POWER SUPPLY

• Ideal for disk drive needs of CRT terminals, microcomputers and video games • Input: 115/230VAC, 50/60Hz • Output: +5V @ 5 Amp, +12V @ 1.8 Amp, +12V @ 2 Amp, -12V @ 0.5 Amp • UL recognized • CSA certified • Size: 7⅜"L x 6-3/16"W x 1⅝"H • Weight: 2 lbs.

$59.95 each or 2 for $99.95

MRM 174KF. . . . . .



Switching Power Supply for APPLE II, II+ & *IIe*™

• Can drive four floppy disk drives and up to eight expansion cards • Short circuit and overload protection • Fits inside Apple computer • Fully regulated +5V @ 5A, +12V @ 1.5A, -5V @ .5A, -12V @ .5A • Direct plug-in power cord included • Size: 9⅞"L x 3½"W x 2¼"H • Weight: 2 lbs.

KHP4007 (SPS-109). $59.95

4-CHANNEL SWITCHING POWER SUPPLY

• Microprocessor, mini-computer, terminal, medical equipment and process control applications • Input: 90-130VAC, 47-440Hz • Output: +5VDC @ 5A, -5VDC @ 1 A; +12VDC @ 1A, -12VDC @ 1A • Line regulations: ±0.2% • Ripple: 30mV p-p • Load regulation: ±1% • Overcurrent protection • Adj: 5V main output ±10% • Size: 6⅜"L x 1⅞"W x 4-15/16"H • Weight: 1½ lbs.

FCS-604A. $69.95

New!

IBM PCXT EQUIVALENT 130 WATT POWER SUPPLY

UPGRADE YOUR PC!

• Input: 100V-130V/200V-260V selectable @ 47 to 63Hz • Output: +5VDC @ 15A, −5VDC @ 0.5A, +12VDC @ 4.2A, −12VDC @ 0.5A • Plug compatible connectors • Fits into IBM PC • Weight: 6 lbs.

IBM-PS. $169.95

$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6½% Sales Tax
Shipping — Add 5% plus $1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30¢ each
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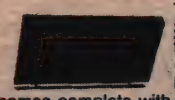
Apple® Accessories

5¼" APPLE™ Direct Plug-In Compatible Disk Drive and Controller Card



The ADD-514 Disk Drive uses Shugart SA390 mechanics—143K formatted storage • 35 tracks • Compatible with Apple Controller & ACC-1 Controller • The drive comes complete with connector and cable – just plug into your disk controller card • Size: 6"L x 3½"W x 8-9/16"D • Weight: 4½ lbs.

ADD-514 (Disk Drive). $169.95
ACC-1 (Controller Card). . . . . $ 49.95

More Apple Compatible Add-Ons...

APF-1	(Cooling Fan with surge protection).	$39.95
KHP4007	(Switching Power Supply).	$59.95
JE614	(Numeric/Aux. Keypad for *IIe*).	$59.95
KB-A68	(Keyboard w/Keypad for II & II+).	$79.95
MON-12G	(12" Green Monitor w/swivel stand).	$99.95
JE864	(80 Col. +64K RAM for *IIe*).	$99.95
ADD-12	(5¼" Half-Height Disk Drive).	$179.95

NEW!

ADDITIONAL APPLE™ ADD-ONS AVAILABLE

ARC-16K	(16K RAM Card for Apple II & II+)	$39.95
AEB-2	(EPROM Burner for Apple II, II+ & *IIe*) Allows copy of standard EPROMS 2708, 2716, 2732, 2764	$69.95
ASSC-P	(Super Serial Card for Apple II, II+ & *IIe*)	$99.95
ADD-IIc	(5¼" Half-Ht. Disk Drive for Apple *IIc*)	$189.95

DISK DRIVES

Documentation Included

Best Buys!

MPI51S	(MPI 5¼" SS full-ht.).	$ 89.95
RFD480	(Remex 5¼" DS full-ht.).	$109.95
TM100-2	(Tandon 5¼" DS full-ht.).	$159.95
FD55B	(Teac 5¼" DS half-ht.).	$149.95
SA455	(Shugart 5¼" DS half-ht.).	$159.95
FDD100-8	(Siemens 8" SS full-ht.).	$119.95
PCK-5	(5¼" Power Cable Kit).	$2.95
PCK-8	(8" Power Cable Kit).	$3.95

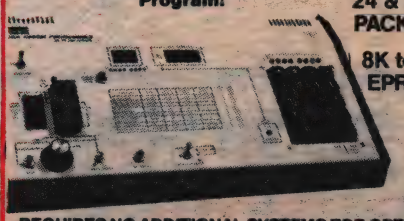
UV-EPROM Eraser

Erases all EPROMs. Erases up to 8 chips within 21 minutes (1 chip in 15 minutes). Maintains constant exposure distance of one inch. Special conductive foam liner eliminates static build-up. Built-in safety lock to prevent UV exposure. Compact – only 9.00"L x 3.70"W x 2.60"H. Complete with holding tray for 8 chips.

DE-4 UV-EPROM Eraser. $74.95
UVS-11EL Replacement Bulb. $16.95

JE664 EPROM PROGRAMMER

See Our New IBM Communications Program!



24 & 28 PIN PACKAGES

8K to 64K EPROMs

REQUIRES NO ADDITIONAL SYSTEMS FOR OPERATION

Programs and validates EPROMs • Checks for properly erased EPROMs • Emulates PROMs or EPROMs • Loads data in RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • 664 RAMs can be used for external microprocessor development • Compares EPROMs for content differences • Copies EPROMs • Input: 115VAC @ 60Hz • Assembled and tested • Size: 15⅝"L x 8¾"D x 3½"H • Wt: 5¾ lbs • **2716 Module included**

JE664-A EPROM Programmer. $995.00

JE665-RS232C INTERFACE OPTION — This option implements computer access to the JE664's RAM, allowing computer to manipulate, store, and transfer EPROM data to and from the JE664. Sample program listing is supplied in MBASIC for CP/M computers • Documentation provided to adapt the software to other computers with an RS232 port • Specs: 9600 Baud, 8-bit word, odd parity with 2 stop bits • Assembled and tested • **2716 Module included**

JE664-ARS EPROM Programmer w/JE665 Option. $1195.00

JE664-ARS COMMUNICATION PROGRAM For IBM-PC or XT and Compatibles

• Fast compiled BASIC program • Easy to use, menu-driven • Print hard-copies of EPROM data • View data in HEX and ASCII **NEW!**

The JE664-ARS Communication Program was written for quick interfacing between the JE664-ARS EPROM Programmer and the IBM-PC computer and compatibles. Menu-driven program allows user to Load and Save EPROM data to and from the computer or floppy disk. Data entered by the computer can be viewed in Hex & ASCII formats. Printed hard-copies are also displayed in both formats. Program is ideal for keeping archives of master EPROMs on disk. The program is compatible for all EPROMs listed with the JE664. Computer requirements: IBM-PC, XT (or eq.) with at least 128K RAM and one serial port. Optional: One parallel port for printer.

JE664-ARS-CP. $49.95
JE664-ARS Communications Program (5¼" Disk and User's Instructions)

JE664-CP CABLE. $29.95
Cable for IBM-PC to JE664-ARS Program (5' Shielded Cable & Connectors)

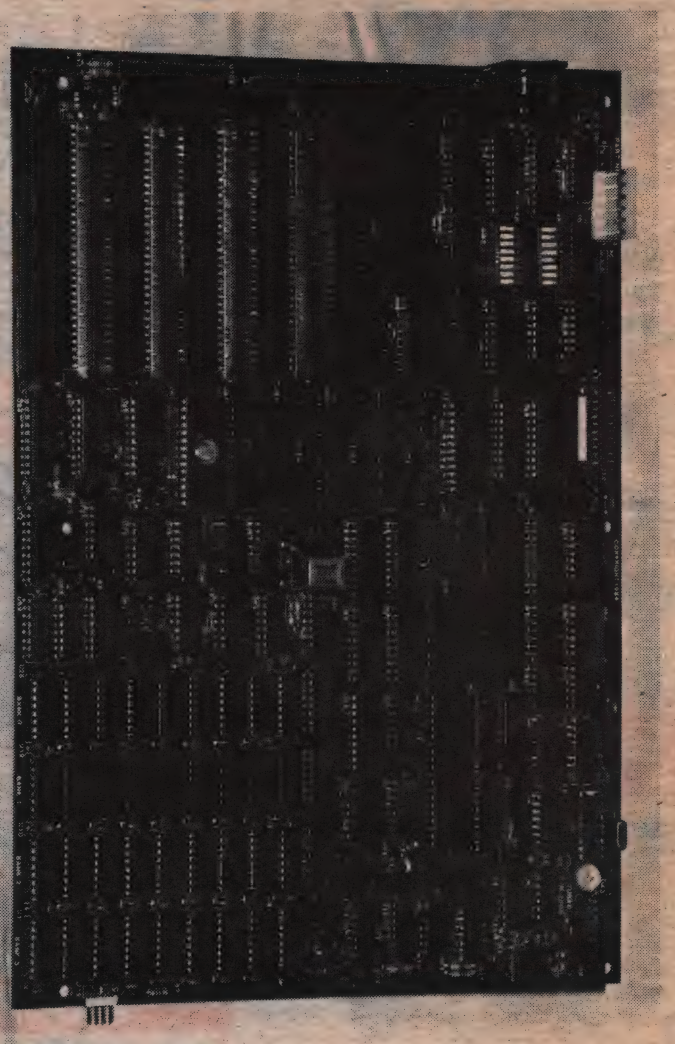
JUMPER (Personality) MODULES — Jumper (Personality) Modules for 8K, 16K, 32K, and 64K EPROMs. *Please specify EPROM and manufacturer.

JUMPER (Personality) MODULE *. . . . . $14.95 each

8MHz/1MB PC

WHERE DO TAVA PC, WESTERN PC, CONQUEST PC, AND STAR PC GET THEIR MULTIFUNCTION MOTHER BOARDS? FROM ADVANCE LOGIC RESEARCH. NOW YOU CAN PUT TOGETHER YOUR OWN PC USING THE BOARD THAT THE PROFESSIONAL MANUFACTURERS USE.

The ADVANCE PC is a single board computer that was designed to maximize compatibility with the IBM PC. The BIOS used by ADVANCE LOGIC is the same that is used on the TAVA PC, WESTERN PC, ETC., and has proven to offer the highest degree of compatibility available.



FEATURES:

* 8088 CPU WITH OPTIONAL 8087 CO-PROCESSOR
* ONE MEGABYTE SYSTEM MEMORY EXPANSION
* SUPPORTS BOTH 64K AND 256K TYPE RAM OR COMBINATIONS
* 40K OF EPROM SPACE, 2764 TYPE EPROMS
* CUSTOM BIOS FOR MAXIMUM COMPATIBILITY INCLUDES HARD DISK SUPPORT
* IBM COMPATIBLE PARALLEL PRINTER PORT
* IBM COMPATIBLE SERIAL RS232 PORT
* OPTIONAL 8.0MHz SPEED UP MODULE REQUIRES NO ETCH CUTS, NO JUMPERS
* 5 IBM COMPATIBLE EXPANSION SLOTS
* SUPPORTS MS-DOS,CP/M 86, AND CONCURRENT CP/M
* 100% BED OF NAIL TESTED PCB
* 4 LAYER EPOXY PCB WITH HIGH NOISE IMMUNITY POWER AND GROUND LAYERS.
* EXTERNAL DIMENSIONS IDENTICAL TO IBM PC

FREE! 8MHz MODULE

WITH PURCHASE OF ADVANCE PC BARE PCB
OFFER EXPIRES 04/31/85
SPECIAL DISCOUNT FOR OEM,EDU.,CLUB

ADVANCE LOGIC introduces the ADVANCE FLOPPY CONTROLLER - a 5/8 disk controller with AST compatible clock, IBM compatible parallel printer port, and IBM compatible serial RS232 port. Also supports at type — 1.2 MB — High Density Drives.

ADVANCE PC BARE PCB WITH DOCUMENTATION	$129.00
8 MHz TURBO MODULE PCB WITH DOCUMENTAITION	$ 29.00
ADVANCE PC BIOS ROM	$ 55.00
ADVANCE PC ASSEMBLED & TESTED 64K	$400.00
ADVANCE PC TURBO ASSEMBLED & TESTED 64K INCLUDES 8 MHz OPTION	$475.00
ADVANCE FLOPPY CONTROLLER BARE PCB	$ 59.00
ADVANCE FLOPPY CONTROLLER ASSEMBLED & TESTED	$199.00
CHASSIS	$ 95.00
130 WATT POWER SUPPLY	$175.00
QUALITY KEYBOARD	$125.00
10 MEGABYTE HARD DISK WITH DTC CONTROLLER	$699.00
MC or VISA ACCEPTED	
SHIPPING & HANDLING? BARE PCB's	$ 5.00
CASES,POWER SUPPLIES,KEYBOARDS	$ 10.00
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CALIFORNIA RESIDENCE ADD 6% SALES TAX	

ADVANCE LOGIC RESEARCH

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Editorial
Continued From Page 13

posium. Representatives of all the major manufacturers and clubs attended. These included Gary Kay from SWTPC, Ed Roberts from MITS, Bob Marsh from Processor Technology, Mike Wise from Sphere, Paul Tucker from HAL Communications, Bill Gates from MITS (Microsoft) in addition to Hal Chamberlain, Lee Felsenstein, Les Solomon, Ray Borrell, Harold Mauch, and others were present. They agreed on a 300 Baud Standard with up to 8 databits in ASCII format. The complete standard included many other parameters and promised to bring a new era of standardization to data recording. The new standard was called the Kansas City Standard. Each person returned to their home company and proceeded to implement a cassette interface. The only one to follow the Kansas City Standard was SWTPC who built a cassette interface unit that would support two recorders allowing a program to reside on one, while the data was stored on the second. Taking its output from the RS-232 serial interface it required no change in the M6800 computer.

Another problem that SWTPC solved was the hard copy question. If you got rid of the Teletype as a terminal and used a CT1024 video terminal, you lost your only printer. Printers in those days were so far out of the reach of hobbyists that you could not even think about them. One of the least expensive was the Decwriter LA-36. You might be able to buy a used one for $1,800 if you could find one! Remember printers for minicomputers were just starting to be built. In 1972 I worked for a printer company who built small drum lineprinters, our cheapest 80-column printer was $10,000. SWTPC built a small printer using an LRC mechanism developed for a cash register. It printed 40-columns and cost only $250 in kit form, (you assembled the electronics, not the printer). This PR-1 printer was a cantankerous beast but it did work. SWTPC also came out with a graphics display unit that produced black and white graphics from program output.

As memory chips came down in price and 2K chips became available 8K memory boards came into use and the restrictions of the SWTPC M6800 memory map started to get "tight" because in those days the program and the data had to be resident in RAM, since there was no disk to write to and no overlays could be used.

It was the floppy disk problem that caused the greatest problems for SWTPC. Dan Meyers realized that the future was in disk based systems and his company was one of the first to come out with a disk system using 8-inch drives. The problem was that there was no operating system for 6800 systems, no Digital Research and no CP/M. The Uterwyck 12K BASIC could be patched to operate the disk but it had no file structure to save and manage data. Another problem was that 8-inch disks were too expensive. The solution to the price problem was to go to the new 5 1/4-inch Minifloppies. SWTPC took that solution contracting for a huge order of disk drives. The software problem was a bigger problem and as time passed and no DOS, or Disk BASIC came out of Tampa, people stopped buying the SWTPC disks and it was stuck with the drives. Some bought drives from Percom in Texas or Midwest Scientific who each had a crude DOS for SWTPC, but the final solution was the release by TCS of the FLEX operating system which saved the day for SWTPC.

By 1979, the TRS-80, Apple and Commodore PET had created a new group of computer hobbyists who were not kit builders but users. This hurt all of the kit manufacturers who didn't switch over to "ready built" computers and it hurt SWTPC but it did not kill it. Dan Meyers came out with better terminals, and the M6809 CPU board which gave the system a new lease on life. Other manufacturers such as GIMIX adopted the SS-50 Bus and built more commercial grade equipment. Finally SWTPC itself got out of the hobbyist business and became a business computer company.

SWTPC is still around selling business systems through a few dealers and GIMIX and a few others keep the SS-50 Bus going but it is mainly used for industrial computing and control.

I personally got off the SS-50 Bus in 1979 and have never looked back except in fond memory of the "SWITS THAT NEVER QUITS." I spoke with Dan Meyers a few years ago and he seems to have lost interest in personal computing, too bad, his contribution was so important that history should not forget it. The young men who are re-writing history of the personal computer in all those books now in print, are ignoring him and his company. ●

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Systems Peripherals Consultants is now providing the answer to your mass storage problems with fast access Winchester disk drives from 10 Mb. to 40 Mb. in a convenient *internal* installation or up to 480 Mb. in our external chassis.

We also provide removable Winchester drives with 5.4 Mb. capacity which double as both an on-line storage device *and* high speed backup. Installation requires only a screwdriver and takes about ten minutes, and we deliver from stock... not promises.

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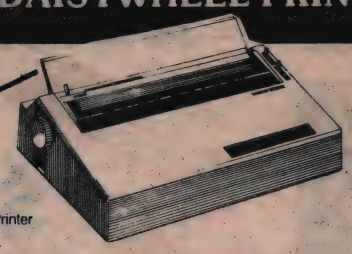

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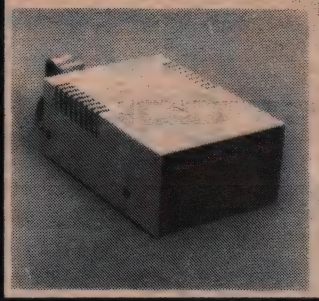

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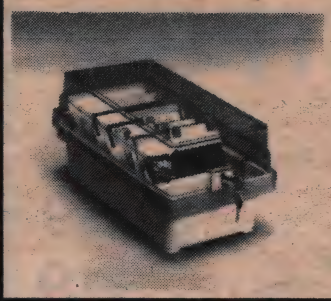

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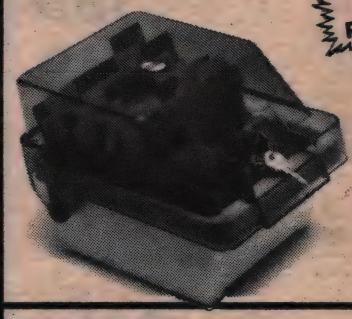

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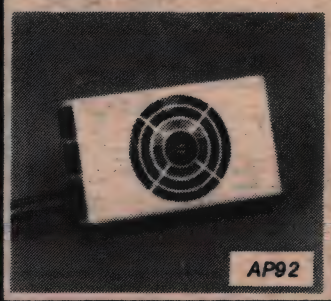

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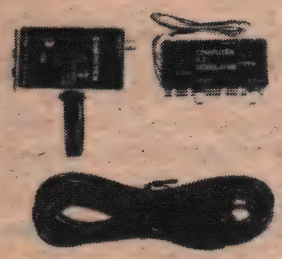

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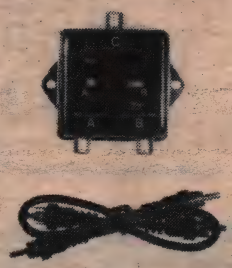

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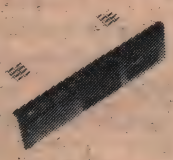

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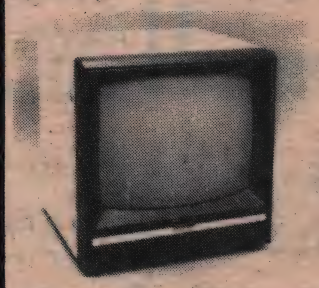

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IBM-MS DOS

Least Squares Curve Fitter

by Andrew M. Fried

Every once in a while an interesting piece of software floats across my desk. This month, I received a nifty piece of software called "LSF - The Least Squares Curve Fitter", written by the Sumar Corporation of Austin, Texas and distributed by the book publisher Prentice-Hall.

LSF is a scientific type program designed to derive mathematical relationships between sets of variables. While it may sound as though its usefulness is restricted to the scientific community, many could find applications for this program. For example, a businessman may wish to find the relationship between advertising expenditures and company profits or floor space vs. inventory.

Using this program, he could enter the sets of numbers and the program will derive a mathematical formula showing the relationship between the two numbers. This formula may then, in turn, be used to interpolate other values within two sets or forecast changes beyond what data has been given.

While an algebra and calculus background would be required to understand the actual workings of the program, no special math background is necessary to use and benefit from the program.

Hardware Requirements

LSF requires an IBM PC (or compatible), 64K RAM, a monochrome or color monitor operating in 80 column mode, one disk drive, DOS 1.1 and an Epson or IBM dot matrix printer (parallel port only).

This turned out to be my only real complaint about what appeared to be an otherwise well done program. In today's market, you just can't afford to support one and only one printer. Five years ago, maybe, but not now. Since my main printer is an Okidata, I was forced to run my testing of the program on my HP Think Jet printer which is, fortunately, Epson compatible.

LSF's Manual

The program comes packaged in a hardcover book like folder that uses velcro to keep it shut. Inside, it has a sleeve to hold the 47 page paperback manual and a sealed plastic pouch containing the single program disk.

One thing that immediately stood out in the program manual was the lack of the usual program disclaimers, Godfather like threats and single CPU restrictions found in every other software package. The manual is actually like a small paperback book in both appearance and packaging and I would assume it will be marketed as such.

The Least Squares Curve Fitter manual consists of three sections; Section 1 provides a somewhat non-technical description of Least Squares Curves, Section 2 presents the actual mathematical formulas used to derive the least squares curves (many may find this a refresher for college algebra) and Section 3 which consists of the program description and operating instructions.

I found Chapter 1 enlightening while Chapter 2 was about as interesting as watching puddles evaporate. Fortunately, both chapters may be skipped and the non-technical user need only concern himself with the final chapter for instructions on how to utilize the program.

Getting Started

As mentioned earlier, the LSF program is designed to find mathematical correlations between up to 300 sets of numbers. These number sets may be the results of scientific experiments, business statistics, engineering studies or any other source.

Inputting the data may take two forms, the first is to utilize the program and manually enter the data sets and the second is to have another program or text editor create the data files. If you use external programs, the sets must be formatted properly; the numbers must be represented in ASCII characters with number pairs separated by commas. A carriage return marks the end of each data line.

Once you have an existing data file you may then have the program perform the First, Second and Third degree Least Squares Fit (representing a linear, quadratic and cubic solution respectively).

What Does It Do?

The operation of the program is simple; you specify which data file you wish to work with and the type(s) of calculations you want performed. Results of the calculations may be displayed on the screen or printed out in graph form.

The visual presentation of the data enables the user to determine which of the three curves best fits the particular data set. As already mentioned, it only works with an Epson or Epson compatible printer. One minor annoyance is that it placed my printer in 17 characters per inch mode which made the chart a little small for my taste; without a printer installation program the program must assume the user has an 80 column printer even though they may have 132 columns or more!

Lets Try It Out

Let's say we work at the Florida Tourist Center and we want to let potential tourists know what type of temperatures to expect during a typical Florida sunshine day. We first need to collect our data, which in this case represents temperatures taken throughout the day. Our data set might look like figure 1.

If we use these figures, LSF will perform all three calculations and determine which one appears to fit the data best. (The lower the R value the lower the error rate for that particular curve).

The results of the three calculations showed that the linear curve had an R value of 197.34988, the quadratic curve had an R value of 28.41747 and the cubic curve a mere 8.23447. We can assume that the cubic curve will provide us with the most accurate representation of the data and the most appropriate polynomial for deriving the equation using other possible data sets.

We may now wish to recalculate the equation and instead of obtaining the mathematical representation of the values print-out an actual scaled graph showing all the data points. This will graphically show us the relation between temperature and time of day.

The results of the cubic solution to our little experience. (See figure 2).

Finally, a copy of the actual plotting printout which will show in much more graphic detail the relationship between time and temperature. Armed with this data, we could show the Florida tourist what temperatures to expect at any given time during the day!

Continued On Page 65

Figure 1

(Time) X VALUE	(Temp) Y VALUE
6	67
7	69
8	71
9	73
10	75
11	77
12	80
13 (1PM)	83
15 (3PM)	79
18 (6PM)	70

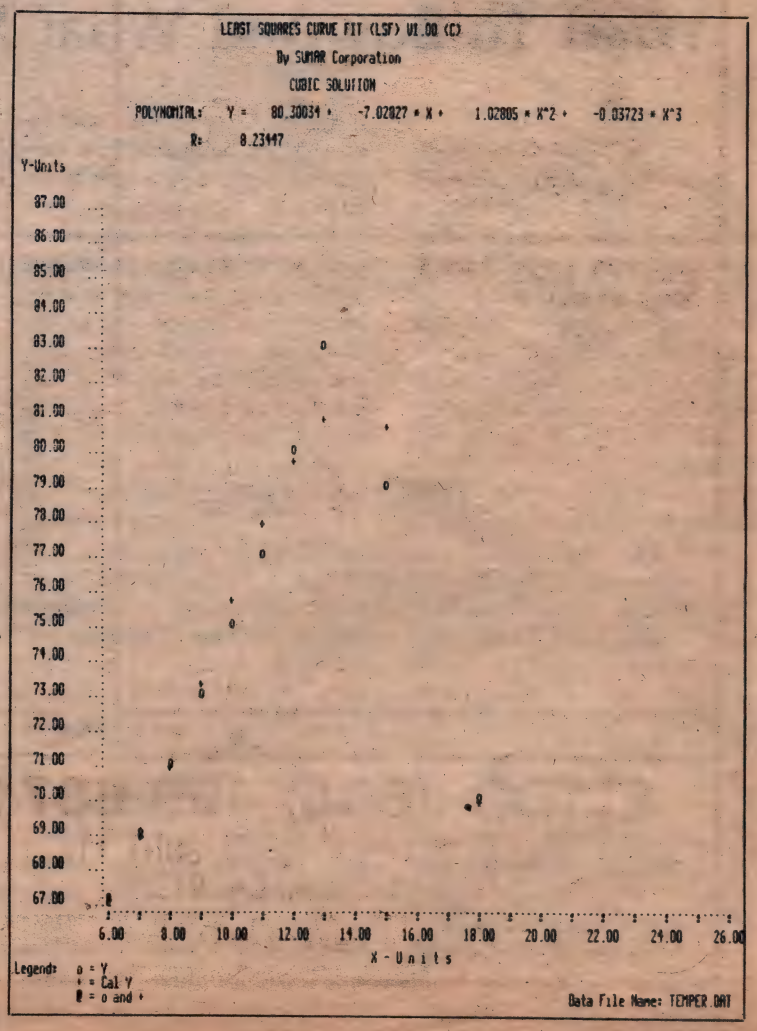
Figure 2

CUBIC SOLUTION

POLYNOMIAL:
Y = 80.30034 + -7.02827 * X + 1.02805 * X^2 + -0.03723 * X^3
R = 8.23447

Pt	X	Y(ob)	Y(cal)	Error
1	6.00000	67.00000	67.09822	-0.09822
2	7.00000	69.00000	68.70603	0.29397
3	8.00000	71.00000	70.80615	0.19385
4	9.00000	73.00000	73.17520	-0.17520
5	10.00000	75.00000	75.58976	-0.58976
6	11.00000	77.00000	77.82645	-0.82645
7	12.00000	80.00000	79.66186	0.33814
8	13.00000	83.00000	80.87260	2.12740
9	15.00000	79.00000	80.52647	-1.52647
10	18.00000	70.00000	69.73727	0.26273

Figure 3



Portable Perils: Defeating Downtime

by Michael Dortch

How's this for a horror story? You've just gotten to the Generic Inn in Provo, Utah. You've set up your portable computer, and you're ready to settle down to a couple of hours of final preparation for the morning meeting to close that big deal. You plug it in, turn it on, and . . . nothing. By the way, it's 6:15 p.m. The nearest computer store is 20 minutes away—and closes in 15.

Whenever the computer goes down, the flag on the meter goes up—freelance writer, consultant, corporate executive or independent businesswoman, downtime costs. This is especially true for users who travel with their computers. A system failure at the office is a calm affair compared to a failure in some remote or unfamiliar location. Even if the problem can be easily diagnosed, the nearest source of service and replacement parts may be back at the office. What to do?

Preventive Planning

Of course, your first line of defense should be established before you buy your system. It must fit both your needs and your foreseeable travel circumstances. If your travels take you frequently off the beaten path, you may have to sacrifice some desired features for a system which is more rugged or easier to get serviced away from home.

Even those who travel primarily between home and nearby office should select their portables with an eye towards availability of service and replacement parts—especially storage devices, displays and power supplies. If you absolutely can't work without your computer, your own set of spare components may make as much sense as backups of your software and data.

Those who already own systems can still take important steps towards downtime prevention. These can be as simple as padded travel cases for your system and accessories—now manufactured by American Tourister, Anvil (which makes instrument cases for touring rock musicians) and others—and packing extra batteries and fuses with your luggage. One of the most important of these steps is creation (or purchase) and maintenance of those software and data backups just mentioned. If you've ever broken a data tape or creased a disk, no more need be said. If you haven't, just keep working—and keep those backups handy.

Users who "telecompute" frequently can and should store backups of important files on remote computers—their "home base" systems, or those of services like the Source and Compuserve. This way, you can still get to and use your data, even if your disks, tapes or RAM packs are in that bag that's on its way to Ixtapa, while you're in Altoona.

Uptime Insurance

If there are areas you and your computer visit repeatedly, find out if there are any "factory authorized service centers" in these areas. If there are, contact these centers, and try to make arrangements for effecting repairs while you are on the road. You may be able to persuade a friendly local dealer to keep certain parts "on call" under your name, if you tell them your needs and visit schedule.

A hardware service/support contract may offer you affordable peace of mind at home and away, particularly if you also use mobile disk drives or printers. (Remember, the components with the most moving parts are most likely to stop working first.) While some larger dealers offer their own support contracts, most dealers will sell you a contract which will be fulfilled by another company.

Expect to pay an annual fee of 12 to 20 percent of total system price for an extensive hardware support contract. Fees vary with the support provider, the term of the contract, and the type of support (e.g., "carry-in" service at a service depot vs. "on-site" at your office).

Xerox's Americare division, for example, is authorized to service Kaypros, Osbornes, NEC's notebook-sized portables and other systems. You can purchase an Americare contract through many computer dealers (although Xerox seems to be abandoning this marketing method in favor of direct sales to corporate accounts). At the moment, service contracts for many popular computers are also available from Sorbus, TRW and other companies.

If you decide to purchase a service contract, try to see that it incorporates periodic preventive maintenance. Preventing problems is always cheaper and easier than solving them—especially away from home. Also try to include availability of a "loaner" system, or loans of key components, while your computer is "at the shop." (Those with newer and/or very popular portables, like the Hewlett-Packard, the Apple //c, or the Epson PX-8 will be hard pressed to get loaners. (Since it was so hard to buy some of these systems in the first place, how many support providers will have a few lying around out back?)

What About Software?

Software can also pose some special problems for portable computer users. Of course, backup copies of programs provide some protection against outright software failure (although not all portable software is copyable by or accessible to the user). However, problems with software use are a bit stickier.

Since many newer systems do not use standard disk drives or displays, they often use "customized" or "modified" versions of even familiar software packages. This means that, in a pinch, you might find a local computer whiz who knows all about the desktop versions of WordStar of Lotus 1-2-3, but has never seen the portable version(s). As with hardware, the odds of finding local help are lower with less well-known products.

Calling the software publisher may not help, either. Some software companies discourage or do not accept "trouble calls" from users. Telephone support is expensive, and competent people are scarce. Microsoft (supplier of system software for the Tandy Model 100 and other portables) and Lotus (which put 1-2-3 on the HP Portable) accept user calls, but it sometimes takes hours to get through. MicroPro (which has developed portable versions of WordStar and other products), like many other software and hardware makers, appear to take user calls under duress, referring users to their dealers for help if at all possible.

In an interview at a computer show, a software company executive said that "(we believe the manufacturers) are primarily responsible for user support, but that the dealers are the 'front lines' of that support." When asked if his firm trained its dealers, however, he smiled and said, "Well, we try."

Software publishers financially unable to provide direct user support depend on their dealers to fill the gap, and provide some dealer training and support. The quality and extent of this support varies considerably. According to some dealers, "support" from some major software manufacturers often consists of a demo disk, an incomprehensible manual, and a "hotline" number which is often the same number given to users.

As a result, many users report a similar set of frustrating circumstances when they call a dealer for software help. The dealer promptly telephones the manufacturer, identifies himself as a dealer, and tries to repeat the user's problem correctly. The dealer then attempts to get a comprehensible answer, and relay it to the user in something approximating coherent English. Do you remember the game "Telephone?"

Some software (and system) suppliers continue to offer users free telephone support, while

Continued On Page 66

Buying And Selling Used Computers
What To Buy And What Not To Buy

by Stan Veit

Now that you have decided to buy a used computer the question of what to buy becomes most important. If you are one of those people who want an Apple, TRS-80 or IBM PC and nothing else, don't skip this month's installment because you still might learn something about the computer you want to buy.

Let us talk about the positive things first. What you want to buy is an almost brand new computer which was bought by a person who immediately had to leave for Zamboanga and never used it. It comes equipped with all the software you want and the packages are unopened. It is being sold by the spouse of the missing person who hates computers and only wants to get that damn thing out of the house! Yeh! Sure!

The next best thing to buy is a fairly new model of a computer that is currently being manufactured and is being sold in stores. An example would be an IBM PC being sold by someone who was upgrading to an IBM AT.

Next most desirable is a older model of a computer that is still being made and sold by an active company still in the computer business. An example would be my IBM PC which is two years old and has a 64K motherboard. This is equivalent to a fairly new, but not too popular computer, an Epson QX-10, with Valdocs, or HP-85 for example.

The next level might be an older model of a popular brand, no longer being made, an Apple III, or even an older Lisa. On the same level would be a brand new computer by a company going out of the computer business such as an Adam, or Franklin.

Next would be a well worn, but working popular brand computer. Somebody's Apple II Plus, or TRS-80 Mod III or North Star Horizon. Last but not least, an older, no longer made computer, that still works well and has a lot of software you want. These are ALL, DO BUY situations, just know what you are buying.

Now for the DON'T BUY situations. Never buy a used computer with a bad CRT. You can tell if it flickers, has burn spots on the tube or "Blooms" when you turn it on, or during operation. You can get replacement tubes but a burned CRT is a sign that the owner left the machine on for long periods of time with an unchanging screen image. Sometimes you can see the image burned into the coating on the inside of the tube. A Visicalc frame is typical. This is a sure sign of hard use or neglect.

Never buy a computer with a keyboard that sticks or shows incorrect characters on the screen when the keyboard is pressed. Problem keyboards are a sure sign of heavy use or neglect.

When you go to try the com-

Continued on page 69

FEEDBACK FORUM

Letters From Our Readers

Dear Editor:

I LOVED your article in the new issue, "Personal Computers Are Ten Years Old - A Look Back".

When I had to do a resume yesterday, I couldn't for the life of me remember when I bought my TRS-80 Model I. An old income tax return would probably show the year, but God knows where it is! And your editorial-article doesn't give dates for the Tandy visit to you and yours at Fort Worth.

However, living on 30th Street, I do remember your Computer Mart, although I bought nothing but a book there after talking with you. I also heard you once at a Coliseum Show, one of those educational lectures. How long ago it all seems!

I've just told the corporate world where to shove it and quit (no pension for six more years) to move back to my old home town, keep an eye on my 92 year-old mother and start a computer business (it says here). With my trusty TRS-80 Model II and all my PROFILE PLUS membership/mailing list clients acquired over at least six years, I sail off into the sunset with a COMPAQ PLUS and the equivalent program, filePro 16, from The Small Computer Company. Add to that a 512K Macintosh system, a used Eagle Spirit XL, a TRS-80 Model 100 and six printers (including the battery operated TTXpress). I may sink into oblivion but I will certainly be having fun.

DO ANOTHER ARTICLE, but a few dates would help, to place these computers relative to each other. Draw a picture, if you have the dates...showing it graph-style, date of introduction of X, Y, Z, etc. There are plenty of us nuts out here who have been reading Computer Shopper for years (before you joined it) and the nostalgic period is obviously under way.

For example, my Model I simply would not cooperate, kept dying in the middle of a mailing list, always in a different spot. Files were always left open and no one at Radio Shack could figure out how to save them. "No one else has this trouble!" Hah! I later discovered that 150,000 of us had electrical troubles, probably due to power surges and poor filtering or whatever. Do you know anything about that? It was a well kept secret at Radio Shack.

I still have a SOLA minicomputer voltage regulator which I got talked into buying, only to have my Model I display on the screen, "Can't format disk, motor speed too fast." Radio Shack screamed and told me not to use it. (Now I use it with my COMPAQ PLUS just to be "safe").

When a new couple moved into our coop, he brought this Model I with him. Guess what! It wouldn't run in this building any more than mine would. In the RS shop, it ran just fine, but the minute I got it home, trouble again. Did your store about a block away have any Con Edison problems???

Have you considered doing an ongoing article about answers to questions? For instance, NO ONE at Radio Shack seems to know what controller the Model II uses and what CHEAP hard disk I can hook to it. I don't plan to dump the machine, but some of my files are too big for the floppies, so I have to subdivide the file by breaking the alphabet up. It's real hell, so I have to buy a transfer program to convert them to filePro 16 on the COMPAQ PLUS.

None of the ads really tell you what computer the hard disk can mate with, they all expect you to KNOW the hardware answers. Some of us may be well informed up to a point, but I've never done my own repairs and don't plan to, so I need technical help.

Keep up the good work. I enjoy the publication and search it monthly, drooling over used bargains. Bought one recently. It may have been stolen, as I discover now, since the serial number is missing, but maybe you can address that risk when you do the next article. Eagle says they don't keep records of serial numbers ...so what ARE my risks?

Pat Sheffield

Dear Editor,

Thank you for the article, "OK-Writer Firmware for the Okidata 82A Printer" by Tom Szlucha in January's Shopper. I bought the item on the recommendation of the article. It was informative and timely. I was not aware of this device until I saw the article. I subscribe to seven electronics magazines. I hadn't even noticed the small 2" by 3" ad on the OK-Writer in BYTE magazine until I read the review. I am very happy with the upgrade. The price from Rainbow Technologies has been reduced to $119.00 from $139.95.

I purchase Computer Shopper at the newsstand every month. Keep up the good work. I enjoy your publication.

Thanks,
Scott Baird

Dear Editor,

I'd like to congratulate you on your start of the Heath/Zenith section of Computer Shopper. I've been an admirer of Heath computers for a long time, though my Z-150 is my first H/Z computer (I had an IMSAI 8080 and - shudder! - a TI-99/4A before it).

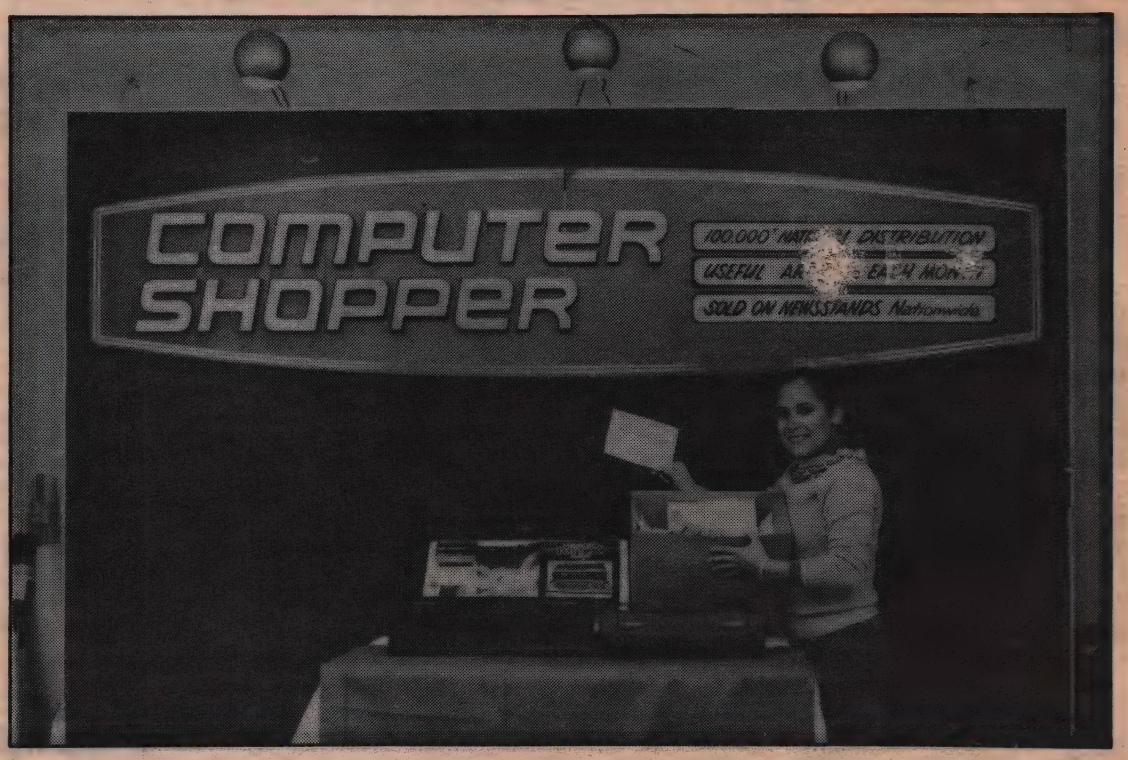
Since we both have the same machine, I'm quite sure that what I'd like to see in future articles will be covered: information and reviews on hardware upgrades. There's enough coverage of software of PC-compatible machines elsewhere. For instance, I hear from a couple sources (one of them being Henry Kisor, who writes a computer column that's published in the Chicago Sun-Times) that ZDS is coming out with another ROM upgrade (ver. 2.0) in March. Since I have an older ROM (ver. 1.7), I'd be interested in knowing what benefits I would gain by upgrading - and, how I go about ordering and installing the new ROM chips. Information and first-hand reviews on that kind of thing would be the thing I'd like to see.

Along that line, I've enclosed a SASE for the return of some information of the 10 meg hard disk upgrade that you mentioned in your column. I think I know how you added the hard disk without having to remove any floppy drives (you mounted the hard disk under the B: drive, right?), but I'd like information on the drive you used (and why) and any problems I could run into if I tried it. Since I've never had the cover off my machine, any information would be useful.

Thanks and best of luck to you and the new H/Z section.

Regards,
Earl Hall

Dennis Curry Wins Computer Shopper Sweepstakes



Nereida Hernandez; Computer Shopper Staffer holds winning entry.

ORLANDO, FL, FEB. 8, 1985. - A special event held in conjunction with the Orlando Computer Manufacturer's Show was the drawing for Computer Shopper's 1984 Sweepstakes. The drawing was done by Mr. Chris Paul of Great Southern Computer Shows during the Feb. 8th session of the Orlando Show. Mr. Dennis E. Curry of GDS Engineering Inc. 2312 Morning Drive, Baytown, TX 77520 was the lucky winner.

The Sweepstakes run to express Computer Shopper's thanks to its readers for its explosive growth during the year, awarded Mr. Curry a Memotech MTX512 computer complete with a printer.

The MTX512 is a sleek black Z80 based machine with many built-in features. It is capable of being expanded into a powerful disk based machine.

Mr. Curry has already received his prize.

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TANDY COMPUTERS

TRSDOS Topics

VS-100 Voice Synthesizer For The TRS80

by Lon Andrews

It finally had to happen!! My wife talks back to me. Our readers talk back to me. My kids talk back to me. Even my dog growls when I speak up. Now my computer has a voice. Nothing is sacred anymore.

Alpha Products has the VS-100 Voice Synthesizer for Models I, III and 4 and software to use with the VS-100. According to the ad the combination of the two does everything but "walk the dog" and, I suspect, take out the garbage. After seeing the ad for several months I decided I had to try it for myself. The only synthesizer for the TRS-80 I've used had such a bad case of "Mush Mouth" that it needed an interpreter before I could understand what it was saying.

When the VS-100 arrived it wasn't too imposing. A board that plugged into the 50 pin I/O bus under the computer, an extension for the volume control, a power supply and a speaker. It was just that easy to install. Plug it in and talk!!!

The manual is small and easy to read. Getting the software up is explained but if you have been around awhile you could skip over a bunch of the manual. Once the board is installed and the software running you will want to run the demo program for your machine.

The VS-100 uses the Votrax SC-01 phoneme synthesizer. The English language has 64 basic sounds needed to create the spoken language. These sounds, or phonemes, are reproduced by the VS-100 upon receipt of one or more of the codes from the computer. These codes range from 0 to 63. Thankfully the operator doesn't have to program based on these codes or the phonemes. The keyboard input is translated into the codes required by the VS-100 and speech is the result. Some words do not reproduce exactly as you may want them to sound. If this happens you need to resort to phonetic spelling or deliberate misspellings. An example given in the documentation is the word "read" which will be pronounced "reed". If you want it to be pronounced "red" that is how you will have to spell the word. Initials such as TRS-80 must be input as "T-R-S-8-0" or with a space instead of a dash. All numbers up to ninety nine trillion will automatically be pronounced without spelling them out as well as some abbreviations and punctuation symbols.

The VS-100 does not have a monotonal voice as do many other synthesizers. The voice has inflections and pitch control. Pitch control level 1 would be a male voice and the next three are higher pitch. While it won't be mistaken for a real live voice it is closer than any I've used yet.

Alpha states that one of the major assets of the VS-100 is its "low data rate requirement." It uses about 12 bytes for a second of speech. This translates to about an hour of speech on a 48k machine or five hours of speech on a double density diskette. In adding speech to your program you can figure about 1K for forty messages of about two seconds (this is from the documentation).

To add speech to your BASIC program you simply change PRINT statements to PRINT* (spoken) or PRINT! (spoken and printed). This changes the statement to a speech statement. I loaded a BASIC program into a word processor and used the SEARCH and REPLACE option to edit the program. This gives you the option of examining the statement to see if you want it spoken before changing the line.

The first time I tried this I ruined a good program. There has to be a balance between spoken and printed statements. Speech used too much becomes tiresome quickly. Used judiciously it can spice up a program and create interest. Use it as an attention getter! Most people will read faster than the computer will speak so it is easy to be bored with the slower operation.

I had the VS-100 set up for my Computer Applications class when it first arrived. After giving the class their daily assignment by way of the VS-100 I allowed several of the students to experiment while I helped some others with their work. I was puzzled to hear prolonged "BEEPS" coming from the Model III in the front of the room. Shortly thereafter I discovered that some of the more common obscenities are censored by the program. It wasn't long before, much to the embarrassment of one of the students, it was found that the same "words" with phonetic spelling would be spoken.

Talker 2.0 software is an optional purchase ($29.95) that you should order with the VS-100. It is the icing for the cake. Once TALKER is loaded control is returned to DOS. When you go to BASIC it will recognize PRINT* and PRINT!PRINT* commands cause the statements to be spoken and PRINT! will cause the statement to be spoken and printed. There are two more ways to get speech. One is the KEYBOARD ECHO that causes everything you type to be spoken and the VIDEO ECHO where everything that is sent to the screen is spoken. The ECHO commands stay in effect even if you leave BASIC. Some machine language programs have their own drivers for screen and/or keyboard and for that reason they will bypass TALKER.

Anyone with elementary knowledge of BASIC can add speech to a program with the VS-100 and TALKER 2.0. There is no real difficulty involved. Although I haven't yet tried it I am sure that there are word processors that will talk using the VS-100 and TALKER 2.0. As long as the drivers do not interfere with the TALKER it should work.

The program does all that Alpha says that it will and does it well with little fuss and muss. It is a bargain if you use or would use a synthesizer. There is no real difficulty in setting up the VS-100 or getting the software up and working. The manual(s) are small and very easy to read. I would like a little more depth in the manual(s). The unit we have gets little use now after the newness wore off. It would suit the hobbyist or experiment minded computer user very well. A great many applications are possible and I am sure software will spring up that will put the synthesizer to work. In looking at a recent Alpha ad I see that they are offering an Artificial Intelligence program called DOCTOR SIGMUND that works with the VS-100.

VS-100 for Model I, III, 4 and 4P (Specify)
$69.95
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Talker 2.0 for Model 4($39.95)
Alpha Products
79-04 Jamaica Avenue
Woodhaven, NY 11421
(718) 296-5916

SUPERMOD4
TRS-80 Model 4 Resource Utilizer

SUPERMOD4 is a program for a Model III DOS being run on a Model 4. Basically it allows you to make use of Model 4 characteristics while you are in the Model III mode. It will run on TRSDOS 1.3, NEWDOS/80 2.x, LDOS 5.x and DOSPLUS 3.x on a Model 4 (not 4P).

There are three files in the SUPERMOD system: SUPRMOD4/CMD, TRSSPEED/CMD and PRELOAD/CMD. SUPRMOD4/CMD is the main program and controls all of the features offered by the system. TRSSPEED/CMD is used to speed up the CPU when the program is being run on TRSDOS 1.3. PRELOAD/CMD is used only when running on DOSPLUS to make it possible to load BASIC.

The files are on a Model III formatted disk and can be copied directly to your system diskette. Each file is provided twice so that you have a backup. The second file has an extension of /BKP.

Once you have the necessary files on your disk you are ready to activate SUPERMOD4. This is done simply by typing SUPRMOD4 followed by some parameters that are given in the docs. If you type the name without the given parameters the program will activate with the defaults set by the authors.

The parameters are SIZE, SPECV, SPEED, SPOOL, SPECP, LITERAL, PAUSE, RESUME, CLICK, F1, F2, F3 and CANCEL. If you enter the parameters incorrectly you will get an error and the program will not load. The command line for the program with all options would look as follows:

SUPRMOD4 SIZE = a
SPECV = b SPEED = c
SPOOL = d SPECP = e
LITERAL = f PAUSE = g
RESUME = h CLICK = i
F1 = j F2 = k F3 = l CANCEL.

Parameters may be separated by a space or a comma.

SIZE where a is either 64 or 80 sets the video size to 64 × 16 or 80 × 24. SPECV where b is Y or N enables or disables two video options - full scroll protection up to 24 lines and cursor correction which will give a correct cursor when reverse video is used. SPEED. c = Y or N. Sets CPU speed to 4MHz (Y) or 2MHz (N). Be sure to see the TRSSPEED option before using this one. SPOOL d is either Y or N and controls the print spooler. SPECP e = Y or N. Enables several printer control codes given in a chart in the docs. LITERAL f = Y or N. Causes all values to be sent to the printer unaltered. PAUSE g = Y or N. Suspends output from the spooler until it is unpaused. Data may be fed to the spooler until it is full. RESUME h = Y or N. Allows the spooler to take up where it was interrupted. CLICK i = Y or N. Enables/disables the keyboard click. F1. j is an ASCII character or number. F1 = "A", F1 = 65 and F1 = 41H all set F1 to produce the uppercase A. F2 and F3 are set the same way. CANCEL deactivates SUPRMOD4.

So much for setting it up. Does it work?? You bet!! The only problem I found was the DIRectory for TRSDOS 1.3 when in the 80 × 24 mode. It was spread all over the screen. It could still be read but each entry took up two lines. The program works just as the author claims except for that one little hitch. I have had some fun with it when I was working with some of the "old" programs that still have to be run on 1.3. I like the ability to call up the spooler from 1.3. With some of the stuff I have to work with it saves me a lot of time.

The documentation is well written though a little short most folks will have no problems at all using SUPERMOD4. Be careful to read the addendum at the end as they deal with the latest version (2.31).

SUPERMOD4 for the Model 4 (not 4P)
Intelligent Technologies Co.
$49.95
21 Campbell Drive

Continued On Page 42

ACCEL 3 Basic Compiler Model I & II

Southern Software
P.O. 39
Eastleigh, Hants
England 5055WQ
Distributed in the U.S. by
Allen Gelder Software
Box 11721
San Francisco, CA 94101
(415) 681-9371
$99.95

by Richard Burckhardt

ACCEL3 and ACCEL4 are two basic compilers produced by England's Southern Software and distributed in the United States by Allen Gelder Software. The operation of the two programs is almost identical. The main difference is that ACCEL3 can be used with almost any TRS-80 Model I/III operating system, while ACCEL4 is limited to TRSDOS, LDOS, or small-LDOS. Another difference is that ACCEL3 is an in-memory system, taking up 5,888 bytes of protected memory. ACCEL4 is an on-demand system where routines are loaded from disk as needed, taking only around 160 bytes. This is called an overlay system. You don't have to protect memory in advance for this type of system.

The first thing I noticed was how skimpy the documentation looked. There was this tiny, 20-page, spiral-bound booklet with a bright orange cover detailing the use of ACCEL3 and ACCEL4, both of which are included on the product diskette. Being accustomed to humongous volumes of documentation which usually make seemingly simple programs difficult, I couldn't imagine this itsy bitsy booklet being sufficient for the complexities of a Basic compiler.

Before I attempted to copy or boot the product diskette, I read the documentation cover-to-cover. I have to admit, on first reading it seemed pretty thorough. After instructing you on backing up the disk on a one or two drive system, it dives directly into a sample compilation of a short program. Running, saving, chaining, and selling compiled programs are discussed using fairly easy to understand language. If you plan to use ACCEL3/4 on programs you want to sell on disk, you have to include the compiler control and run-time routines provided on the product disk for your compiled program to run. Southern Software gives you permission to do so as long as you don't include the actual compiler. You also have to acknowledge in your program documentation that ACCEL3/4 was used.

If you use ACCEL3 for tape sales, you have to invest in Southern Software's TSAVE ($9.95), which produces core-image tapes which are completely self-contained so that programs will run using the SYSTEM command. ACCEL4 doesn't support tape usage.

According to the speed performance chart in the booklet, the speed improvement ratio for a simple GOTO command is 216 to 1. Sounds impressive, but the compiled programs are not entirely machine language, but a hybrid of compiled and interpreted Basic, so the actual performance in your own programs will not improve that dramatically. Southern Software suggests that your speed will improve anywhere from a few percent to 30 times.

Further, Southern Software disclaims any commitment to the figures given. Also of interest is the fact that it is possible for a compiled program to take up less space than the Basic source program. This appears to be the exception rather than the rule if the comparison chart provided in the documentation is any indication.

The remainder of the documentation takes you through some programming examples which are included on the disk. Some additional background on the compiler and hints for its use are also given.

If the program was as easy to use as the documentation seemed to indicate, I was in good shape. My initial distrust of the documentation had been laid to rest for the moment. The only way to be sure was to jump in.

My previous exposure to Basic compilers was with two that were written in Basic. Not only were they painfully slow, but they had so many restrictions as far as what Basic commands could be used that I was constantly having to rewrite program lines to accommodate them. I finally gave up on them.

Running ACCEL seemed simple. You go to Basic, set the number of files you need for the program you are going to compile, protect memory if necessary, do a CMD"I", "ACCEL"(for TRSDOS), then RUN or SAVE your compiled program as a /ACC file. Nothing to it as long as ACCEL has been activated. If it has not, you will get error messages if you attempt to run one of your compiled programs.

ACCEL3/4 has a few restrictions, but nothing like what I was used to. Certain immediate mode commands such as SAVE, RUN or LOAD are definite no-nos, as I found out in my first attempt at compiling a mailing list program which included a SAVE command. Complex string statements, such as those used with game graphics, also give ACCEL indigestion. Several Basic game programs I attempted to compile were rejected with an "ST error in line nnnn." The only solution to this is to break down the string statement into separate statements.

Before attempting to compile every Basic program I owned (which I nearly did), I tried the sample programs provided on the product diskette. The first one I tried, MICE/BAS, didn't seem to do anything when I ran it in Basic. It just showed some graphic blocks on the screen. When I ran the compiled version, though, all hell broke loose on the screen and sounds came through the connected speaker. The graphic "mice" scampered all over the screen, squeaking as they went. The same was true of MUSIC/BAS, which didn't do anything at all when I ran it in Basic. The compiled version played a nice little tune. These were impressive examples of the increased speed of a compiled program.

I never could get OVERRUN/BAS to work correctly. I suppose I was doing something wrong, but this program, which is supposed to collect and validate input for a work order, refused to accept any input I gave it. The compiled version likewise refused my input, so I am at a loss as to what this example was supposed to show me, though the documentation says it is supposed to prevent keyboard overrun when compiled.

Once a Basic program is compiled, you can RUN, SAVE, LOAD, or LIST it just like it was still in Basic. You cannot EDIT a compiled program. Editing must be done to the Basic source code and then recompiled. When you LIST a compiled program you see only those lines which could not be compiled. The machine code is invisible.

If your Basic program doesn't have any of ACCEL's restrictions. the compiler is extremely easy to use. If some of those no-nos pop up though, compiling your program could become a bit complicated. At the very least, you will have to find the illegal command and remove or change it. At the most, you could wind up rewriting a large part of your program. ACCEL4 found errors in Basic programs I tried to compile which had never shown up in use of the programs before, making it next to impossible to successfully compile them. Only about half of the dozen or so programs I attempted to compile were compiled without problems. One bowling game program which worked beautifully in Basic wouldn;t work at all when compiled. After giving game instructions on the screen, the game graphics would appear for a second, then jump to the 'Another game?' prompt without giving you to chance to play at all. The speedup of other programs was so pronounced that it was ludicrous, shoot'em up games with targets racing across the screen so fast that you could hardly see them much less shoot at them. Other programs, such as a database, hardly seemed to notice that they had been compiled. There was little difference in the way some programs ran after being compiled.

The ACCSU/CMD module allows you to set up what amounts to a DO file so that you can run a compiled program from DOS like a CMD file. It works, but TRSDOS users could just as easily have used the BUILD and AUTO DO commands to accomplish the same thing. This may explain why the example in the documentation for the DUMP used by ACCSU/CMD won't work under TRSDOS1.3. I had to dig out my TRSDOS manual to find the correct syntax.

If you really want to speed up your programs, you can use ACCEL3 with ProSoft's Trashman garbage collector program. Instructions for combining thse two are provided.

After considerble experimentation with the compiler, my distrust of the skimpy little manual returned. If everything works, the manual is sufficient, but if you run into problems, the manual may not be a great deal of help. I would like to see a chapter set aside to take you through some of the more common problems step-by-step. I have seen worse documentation, but I have seen better, too. This falls in the middle of the spectrum.

Compared to some other compilers, ACCEL3/4 is easy to use and I would highly recommend it. For those who have used compilers before, it should be a snap. For beginners, it could be a little confusing. If you really feel you have a need for a compiled Basic program, ACCEL would be a good [illegible]ice. ●

TRSDOS
Continued From Page 41

Dix Hills, NY 11746
(516) 462-6970

System Diagnostic

This program by Howe Software is designed to check every component of your TRS-80 Model I, III or 4 computer for correct functioning. You must order the correct version for your machine as the program will only run on the model for which it is written. An exception to this is the Model III version which will run on the Model 4 but the disk drive timer will not function correctly.

Tests are included for ROM, RAM, Video Display, Keyboard, Line Printer, Cassette Recorder (I & III only), Disk Drives and RS-232 Interface. Since individual systems differ in setup you are given the opportunity to select the tests to be run each time you run the program. ROM and cassette operations are not included in the Model 4 version of the program.

The program also includes some possible causes that are shown when an error or fault occurs. Advice on repair is provided for some faults that are self correctable while others are referred to a service center. I have found that after several years of owning various computers that I am getting more and more comfortable making minor repairs or adjusting my computers. At first I was scared to death to take the cover off the Model III (after all it DID invalidate the RS warranty ... all 90 days of it). One of the most common faults I have found is not keeping the drives cleaned. One of the "experts" told me to never use a drive cleaning kit as it would ruin the drives in short order. I'm glad that I didn't listen. We clean the drives on the machines that I am responsible for at least monthly, some more than that due to heavy use. Our drive maintenance record, after three years of hard use by students, shows

Continued On Page 72

MISCELLANEOUS

Them Golden Gates

by L. Van Delray

In past columns, we discussed bits, nybbles, and bytes as being the fundamental particles of CPU communication—sort of the atomic nuclei from which all software is formed.

There is also a bottom limit in hardware. The fundamental elements that make up this area are called "gates" and these form the basic building blocks of all computers.

There are four types of gates, with three having inverted companions (shown in parenthesis), called AND (NAND), OR (NOR). Buffer (Inventer), and EXOR—which stands for EXclusive OR. This column will cover the basic operation of these fundamental hardware particles.

The reason for learning a little about these basic elements is that all computers, and just about all peripherals, are formed from combinations of these simple gates—just like a large and possibly complex structure can be created from a number of simple bricks.

If you understand how gates work, not only can you begin to understand computer hardware, you also get a pretty good head start on understanding machine-language. As an added bonus, you will discover that a knowledge of gates can help you use those dedicated scientific calculators that have various logic functions built in.

There are two families of gates called "positive" and "negative" logic. If a logic-1 output is a positive voltage while a logic-0 is ground (the usual case), then this is called "positive" logic.

If a logic-1 is ground or negative, while a logic-0 is a more positive voltage, then you have "negative" logic. Usually, the only places you will see negative logic used are when there are extra gates within an IC package available.

Inverter. The simplest logic element is a single-input/single-output device called an Inverter because that is exactly what it does—it inverts the signal applied to its input.

If a logic-1 is presented to the input of the inverter shown in Figure 1, then a logic-0 comes out—and vice versa. The "truth table" for the inverter is also shown in Figure 1. A truth table is a simple logic "map" that shows the relationships between the inputs of a device and its outputs.

Note that there is a small circle at the output of the inverter. This circle signifies that the signal is inverted. You will see more of this little circle as we go along, and whether it appears at the input or output of a logic symbol, it always means "invert."

Although it doesn't appear that the inverter is very complex, it can play an important role in logic design.

The opposite of an inverter is called a non-inverting buffer, and as shown in Figure 1, whose logic symbol is the same as the inverter except that the small circle at the output is omitted. In such a buffer, a logic-1 input develops a logic-1 output, and a logic-0 input develops a logic-0 output. Thus, what logic level comes in, the same logic level goes out.

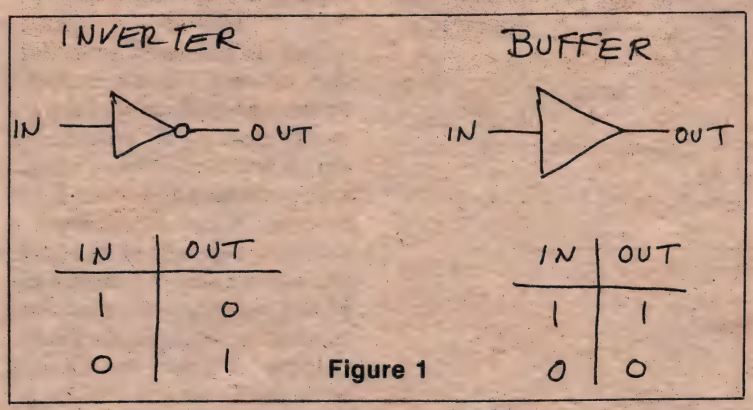
The AND Gate. The basic AND gate shown in Figure 2 consists of two switches in series with a battery and light bulb. It is obvious that only when switch #1 AND #2 are closed at the same time, will the light bulb get power from the battery and glow.

If, at any time, either switch is opened, the AND circuit ceases to exist and the light bulb will go out. The "truth table" for the AND gate is shown in Figure 2. If you substitute "1" for on, and "0" for off, this truth table will apply to any logic AND gate.

The most common form of AND gate is a multi-input logic element (there may be up to eight inputs) within an IC. Up to four AND gates can be used within a single IC.

Within an IC, schematics are not shown and only the logic format of Figure 3 is used. In essence, an AND gate is used to signal the simultaneous presence of logic-1s on each input.

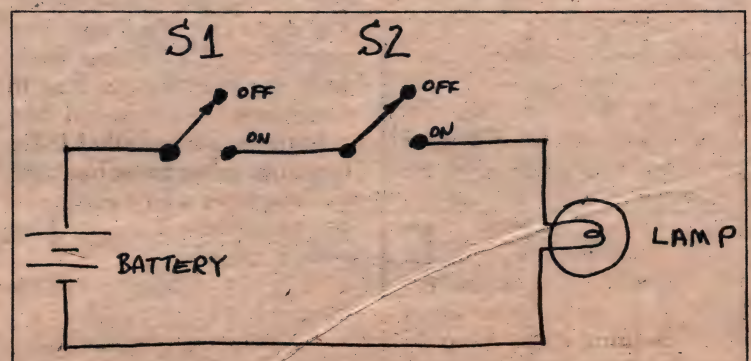
Continued On Page 44



IN	OUT
1	0
0	1

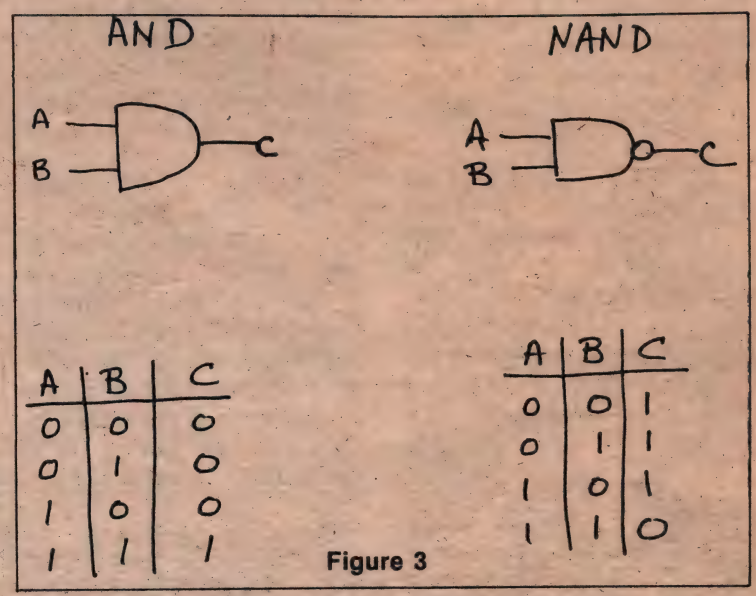
IN	OUT
1	1
0	0

Figure 1



S1	S2	LAMP
OFF	OFF	OFF
ON	OFF	OFF
OFF	ON	OFF
ON	ON	ON

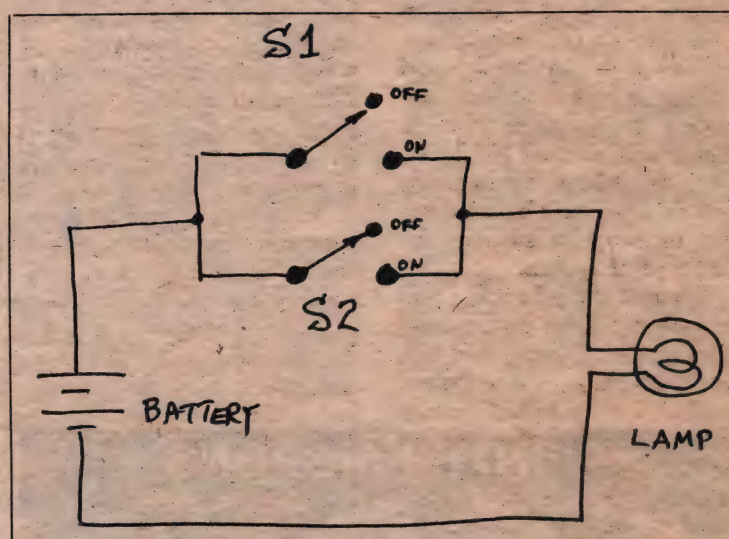
Figure 2



A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

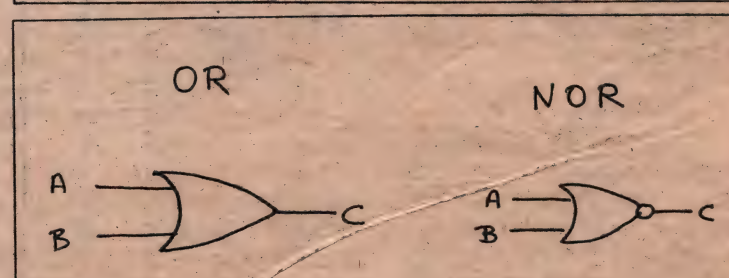
A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

Figure 3



S1	S2	LAMP
OFF	OFF	OFF
ON	OFF	ON
OFF	ON	ON
ON	ON	ON

Figure 4



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

Figure 5

New Display Technology Makes Screen Easy To Read

A new display technology that makes the screen of the Morrow Pivot portable computer easy to read under any lighting conditions is now a standard feature of the lap-top system.

The display, which solves the legibility problem common among the current generation of battery-operated portables, provides dramatically sharpened contrast and crisp bright lettering on a CRT-like black background.

According to company Chairman George Morrow, the new display approach, created by the Morrow design team specifically for the Pivot, combines the high quality of electro-luminescent (EL) displays with the low cost and power consumption of liquid-crystal displays (LCDs). The original Pivot and most other portables have used LCDs that required a direct-light environment for maximum clarity.

"Poor LCD legibility has almost obviated the whole reason to have a portable -- being able to take your computer anywhere and use it anytime," Morrow said. "Up to now, the only viable solutions have been expensive and power-hungry EL displays like the one Grid uses. We wanted to solve the problem without driving up the cost of the system beyond the range of our customers.

"The alternative we've come up with," he said, "adds specialized lighting and contrast enhancements to existing display technologies. The result costs far less than an EL display, and it's much more readable in any kind of light than a standard LCD. Yet it's so logical, we're wondering why some of our larger competitors haven't figured it out before."

Introduced in May 1984, Pivot is still the only available battery-operated machine to offer 5¼ inch IBM-format floppy disk drives, Morrow added. "Now it's also the only one to have a highly readable display. That makes it the closest thing on the market to what users are looking for in the ideal IBM-compatible portable."

Pivots equipped with the new display are priced $100 higher than previous units. The Pivot Model 1622, with two floppy drives and 256K bytes of RAM, is priced at $2,995; Model 1662, with two floppies and 640K bytes of RAM, at $3,795. Factory upgrades are available for $100 to retailers and end-users with previously shipped models.

The 10-pound Pivot portable computer, based on the low-power 80C86 16-bit microprocessor and the industry-standard MS-DOS 2.11 operating system, can run such popular programs at Lotus 1, 2, 3 and the PFS: series. The 13 x 5.6 x 9.5-inch unit has a 16-line x 80-column display with 480 x 128-pixel bit-mapped graphics. Pivot offers as standard ROM-based utilities six executive productivity functions, including personal appointment scheduler, phone directory and calculator.

For more information contact John Seamster Morrow, 600 McCormich, San Leandro, CA 94577, 415-430-1970 ●

Them Golden Gates Continued From Page 43

There are occasions where an "opposite" of the AND gate is required. That is, when all inputs are high, the output is low. In this case, we use the conventional AND symbol and place the inverting small circle at the output. The logic diagram and the truth table for a NAND (Not AND) element is also shown in Figure 3.

The OR Gate. The next logic element is called an OR gate, and uses the principle shown in Figure 4. Once again we have the simple circuit formed from two switches, a battery, and a light bulb.

However, in this case, the two switches are connected in parallel so that if switch S1 OR switch S2 is closed, the light bulb will glow. The truth table for the OR circuit is also shown in Figure 4.

As you can see by the truth table, an OR gate provides a logic-1 output if either input is high, and a logic-0 output when all inputs are low.

The OR function is usually created by an IC symbol as shown in Figure 5, although sometimes an OR gate is created using diodes.

As in the case of the NAND gate, there are occasions where an "inverted" OR gate will be required. By adding the small circle at the output, we have a NOR (Not OR) shown with its truth table in Figure 5.

The last gate is called EXOR (EXclusive OR) and a logic device and truth table is shown in Figure 6. This gate has a somewhat more complex logic approach than the other gates covered. It develops a logic-1 output if only one of its inputs is at logic-1. If both inputs are logic-1 or logic-0, then the output will be logic-0. As shown in Figure 7, this gate can also be made from three 2-input NANDs and a pair of inverters.

Despite this seeming complexity, the EXOR gate finds wide use in computer circuit design.

So there you have them, the fundamental building blocks of digital logic. Using just these gates, some very complex computers, and their peripherals, can be built.

Some readers might say, aren't some of these gates and truth tables "mirror images" of others?

The answer is "yes," and this occurred to a logician named DeMorgan. He noted that a positive-logic AND is the same as a negative-logic OR: and a positive-logic OR is the same as a negative-logic AND (with the same going for their NAND and NOR counterparts). This became DeMorgan's Theorem in logic applications.

This theorem is why you may see gates being used in "un-natural" ways. However, it is not the logic that is unnatural, it is only the circuit designer's efficient use of extra gates. DeMorgan's Theorem can save a lot of design time, and save some hardware.

Future columns will show how combinations of these gates are combined to form all types of very useful digital circuits.

Fan In and Fan Out. IC's usually communicate with other ICs. To do so, each IC requires a certain amount of signal "drive" at its input, and it can deliver only a certain amount of power at its output.

The input drive requirement is called "fan in" while its output power is called "fan out." These are usually spelled out in the specification sheet for each IC.

To use the fan-out specification, add up the number of fan-in's the chip will drive, and make sure that this number is not larger than the fan-out number of that chip. For example, the fan out of a typical TTL device is 10 meaning that it can drive 10 separate TTL inputs. If you try to drive 11 devices, the fan-out would be overloaded and the output voltage would drop below that required to assure a logic-1 output. ●

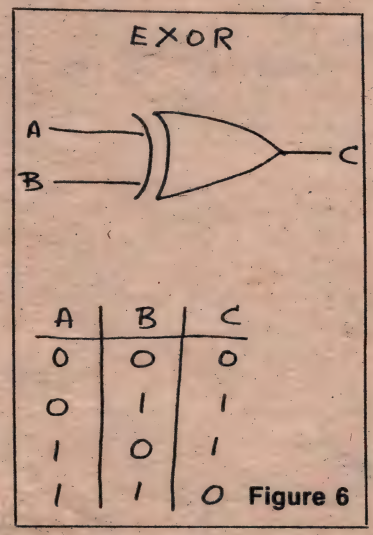


Figure 6

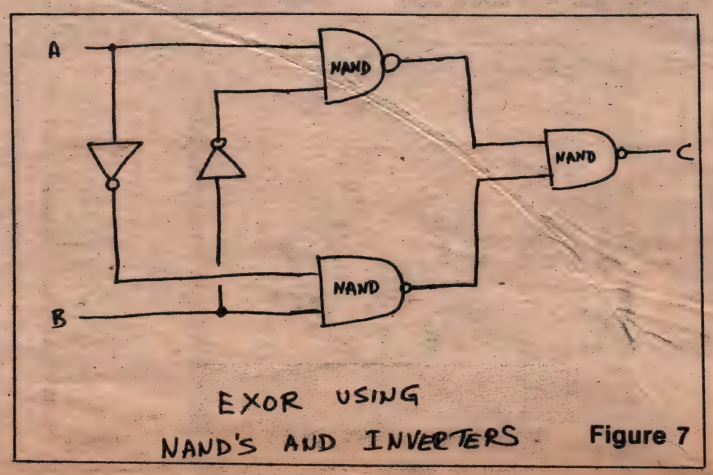


Figure 7

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Printer Model	Price Each In Quantity Of 1-3	4-6	7-9	10-12+
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Apple DMP Printer, Imagewriter	5.45	5.05	4.83	4.60
Brother HR15-25/EM60-200 Nylon	5.95	5.45	5.33	5.20
Centronics 150/152-2	6.00	5.70	5.40	5.10
Centronics 700 Zip Pack	3.45	3.25	3.15	3.05
Centronics 779, 780, 781, 790, 791, 792	8.50	8.30	8.10	7.90
C. Itoh Prowriter I/II	5.45	5.05	4.83	4.60
C. Itoh Starwriter II, Starwriter 25	5.95	5.65	5.35	4.95
Commodore VIC 1525	7.00	6.50	6.38	6.25
Diablo Hytype II Multistrike	4.45	4.15	4.03	3.90
Diablo Hytype II Nylon	4.50	4.20	4.05	3.90
Digital LA30/LA36/LA40	4.75	4.45	4.35	4.15
Digital LA34/LA100	5.90	5.40	5.20	5.05
Epson LQ1500	10.95	10.45	10.20	9.95
Epson MX/FX/RX70/80	4.95	4.70	4.58	4.45
Epson MX/FX/RX100	6.70	6.20	6.10	5.95
IBM 6240 Multistrike	5.00	4.50	4.38	4.25
IBM Displarwriter	6.50	6.25	6.05	5.85
IDS Paper Tiger	7.10	6.60	6.48	6.35
IDS Prism	8.00	7.50	7.38	7.25
IDS 480 Microprinter	6.25	5.75	5.63	5.50
NEC 2000/3500 Nylon	8.20	7.70	7.58	7.45
NEC 5500/7700 Multistrike	4.90	4.60	4.45	4.30
NEC 5500/7700 Nylon	4.95	4.75	4.68	4.50
Okidata Microline ML80/82/83/92/93	2.35	2.15	2.10	1.95
Okidata Microline ML84 Dual	4.70	4.45	4.35	4.15
Qume Sprint 3/5 Easyload II Multistrike	5.00	4.75	4.50	4.25
Qume Sprint 3/5 Multistrike	3.85	3.65	3.55	3.45
Qume Sprint 3/5 Nylon	3.95	3.75	3.65	3.55
Qume Sprint 7/9/10/11 Multistrike IV	5.25	5.00	4.75	4.50
Qume Sprint 7/9/10/11 Nylon IV	7.50	7.15	6.80	6.55
Radio Shack TRS-80 LPII/III/V	5.35	4.85	4.73	4.60
Radio Shack TRS-80 LPVI/VIII	5.55	5.20	5.05	4.85
Radio Shack TRS-80 LPVII	7.95	7.85	7.75	7.65
Radio Shack DMP2100	7.15	6.65	6.53	6.40
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APPLE II

Appleworks - Three Packages In One, Or Not Enough?

by Philip Chien

Appleworks is an integrated word processing/database/spreadsheet package from Apple computer. It requires an Apple IIc or an Apple IIe with an 80-column card. An extended 80-column card is highly recommended, and extra disk drives are also important for any serious application.

Originally Haba Systems came out with III EZ Pieces for the Apple III. When Apple Computer released ProDOS, Haba produced a version of III EZ Pieces for the Apple IIe, and sold it to Apple, who then released it as Appleworks. The programs are almost identical on both machines, and files are interchangable. You can start a report on your Apple IIe at home, work on it with your Apple III at work (using IIIEZ Pieces) - and even use the files on an Apple IIc.

Loading Appleworks is a two step process. The startup disk, which includes ProDos, and the core (sorry 'bout that) of Appleworks is first loaded. The user is prompted to put the program diskette into the boot drive, and the user is then prompted to type in the date (Appleworks keeps track of when files are created, or modified.) If the system has a ProClock installed, then the date and time will automatically be added to the directory information. When the program is loaded, the screen displays the amount of free memory available. A 64K Apple IIe with the non-extended memory card has only 5K of workspace available. For an Apple IIe with the extended memory card, or an Apple IIc the workspace jumps to 55K, for an Apple III with 256K of RAM, 175K is available to the user. Different segments of Appleworks (e.g. word processing editing, printing, create data format, etc.) are loaded as needed so the program diskette must always be online. If you have only one disk drive the program will tell you when to swap the Program and Data diskettes. You will have to do a Lot of disk swapping.

Once Appleworks loads, it is very friendly and simple to use. Menu functions are highlighted (inverse), and you can either type in the number next to the command, or use the arrow keys to select the desired functions. Similar functions in different sections use the same key strokes. (Does the "S" key stop my word processor's printer? Or was it my database? Whoops! It was "S" for Save, not Stop!) OA-O (typing the Open Apple and 'O' keys at the same time) means set different character size in all three portions of Appleworks. Any potentially dangerous operations include confirmation prompts. (e.g. the file "Sample 1"already exists. Should I write over it, or save it under a different name?) Anytime you enter an incorrect section, the ESCape key should correct the problem. Two different cursors are used. A flashing underline indicates that Appleworks is in the overstrike mode, and a solid block indicates overstrike mode. Much easier than the title line "Insert" flag used in WordStar. OA-E toggles between the two editing modes. An online help menu is built in, and the program comes with a plastic laminated "cheat sheet". I learned how to use Appleworks in under an hour - without the manual.

Although you can use Appleworks without a manual, it's nice to know that it does come with two. The 140 page tutorial manual takes you step by step through creating, and using various files for each of the three individual programs which are included on the sample files diskette. You learn how to edit the files of a company called "Mom's Apple Pie Company." While using the tutorial, you will edit actual files and learn various word processing, database, and spreadsheet functions. Even if you have never touched a computer before, by the time you finish using the tutorial (about 2-4 hours) you will know how to create, edit, save, and print files from all three functions. The 319 page reference guide includes additional information on the various functions, how to customize Appleworks for specific printers, etc. Apple has always had the reputation of the best user oriented manuals in the software industry, and Appleworks is no exception.

Surprisingly, Appleworks is totally copiable. (Thanks Apple!) You are encouraged to copy the diskettes when you first open the package, and only use the backups. You don't have to worry about destroying, or losing your original diskettes. Putting Appleworks on a hard disk drive is a simple two minute operation (as long as the drive supports ProDOS), and you do not have to leave any portion of the program on the floppy diskette. The entire package, programs, variables, and data can all reside on the hard drive.

Appleworks can be easily customized for almost any user setup. High density disk drives can be configured by adding ProDOS drivers and printers can be easily added or deleted. The program will support up to three different printers at the same time. Drivers for the various Apple printers, Epson, and Qume are built in, and if your printer isn't already listed, you can "train" Appleworks how to use it. The program creates, and reads both DIF and text files, so it is easy to transfer data back and forth between Appleworks and other programs. A unique feature of Appleworks (at least on the Apple II series - it is built in on the Lisa and Macintosh computers) is a "clipboard" used for transferring data between the different modules. You can easily put a spreadsheet, or database report in the middle of a word processing document. The clipboard doesn't truly make Appleworks integrated though. If you change data in a spreadsheet after "clipping" that data into a word processing document, that data will not be changed in the word processing document. It's not much of a limitation, but you should be aware of it.

Appleworks uses the ProDOS operating system, and was designed to use it as efficiently as possible. There are three ProDOS file types designated for Appleworks (ADB database, AWP word processing, and ASP spreadsheet). The files are only compatible with Appleworks, but will load and save much faster than standard binary or text files. Since Appleworks has the capability to translate files back and forth between standard DIF and text files and its own files, this is not much of a limitation, and most users won't even need to do any translations anyway.

If you already have an Apple IIe, and are purchasing Appleworks, I highly recommend that you also purchase the ProDOS user kit if you don't already have it. Appleworks includes the ProDOS system files, but does not contain the utilities such as "CONVERT" (which transfers files between DOS 3.3 and ProDOS), or "FILER" (which transfers and maintains files within ProDOS). The ProDOS User kit also has a manual which includes more information on how the ProDOS Pathnames work.

The database module is an enhanced version of the popular "Quickfile" program. It is totally RAM resident (e.g. Once you run out of memory in your Apple, you can't add anymore records. Your file must be split into parts if you want to continue). Although this may be a limitation for some people, most users won't have any problems. There is enough memory in a 128K machine to keep track of a mailing list with over 1000 names and addresses. The major advantage to a RAM resident database is speed. Records can be found instantly, and sorts, moves, insertions, and deletions all can be handled without disk access. The database's select makes the program even more powerful. Twelve different select criteria (EQUALS, IS GREATER THAN, IS LESS THAN, IS NOT EQUAL TO, IS BLANK, IS NOT BLANK, CONTAINS, BEGINS WITH,

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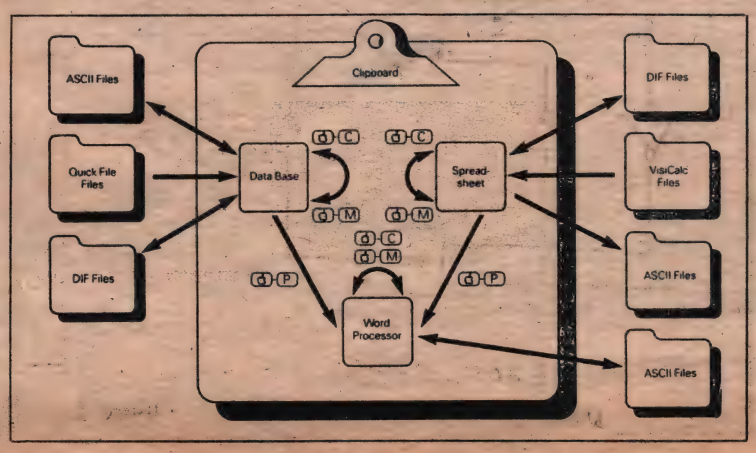

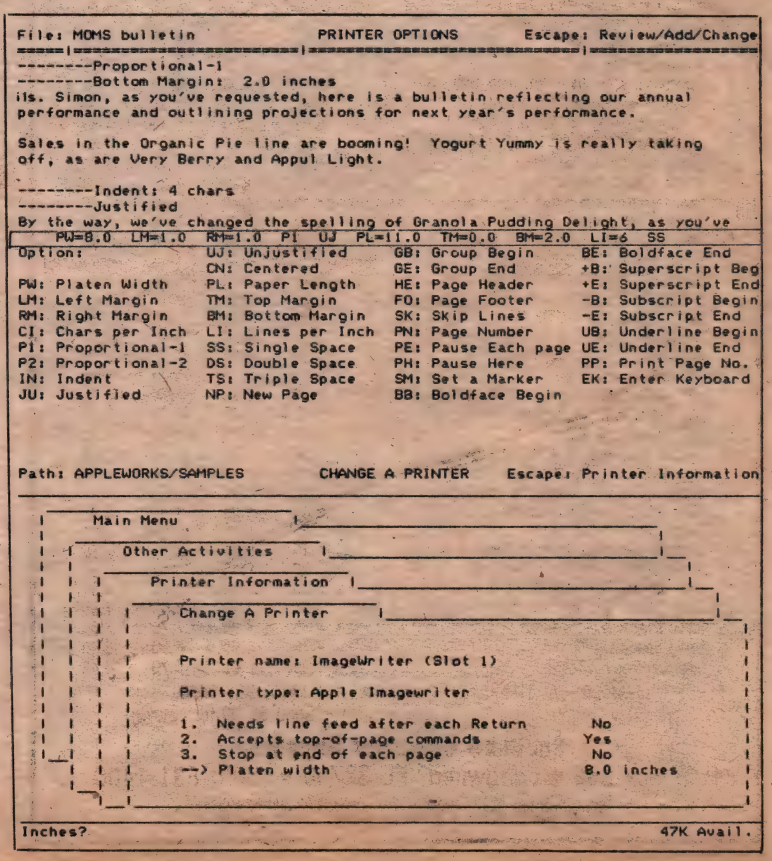

Translate 9-Track Tapes With Your Apple Open The Door To A Vast Storehouse of Data

There is a vast storehouse of vital government data that is available for a small copying fee to anyone. This includes the complete directory of postal zip codes, FAA aircraft registration number files, FCC files, Federal Stock Number directory and Government Specification directories. In addition many large mailing lists offered for sale or rent are in 9-track tape format. Although this information was readily available, using it required a large computer and the type of tape drive equipment usually found in large mainframe computer installations. Anyone needing this kind of data for a company that does not have this type of equipment had to spend a lot of money to convert it to a personal computer format.

Electrovalue Industrial Co. of Morris Plains, NJ, has been selling for several years, a unique product that allows these 9-track tapes to be read by an Apple II computer. Using the same Electrovalue equipment, the user can also write to the 9-track tapes if so desired. The tape system consists of an industry standard 9-track tape drive with an Apple II adapter, cables and a controller that plugs into any available slot on an Apple II Plus or Apple IIe. The system will also work on a Franklin Ace.

Electrovalue supplies several models of tape drives, but the operation is essentially the same. The package not only contains the hardware but also the software running under Apple DOS 3.0 to test, operate and integrate the data into your own system. To test the system, Electrovalue shipped us a complete set up and we had it installed at Space Coast Systems who are manufacturers of Apple and IBM compatible hard disk systems. David Davis, president of Space Coast Systems has many years of experience with tape drives and with all kinds of Apples. He is the ideal person to check out this system for our readers. The following is his report.

The important feature of the system is that it runs ANSI standard 800 BPI IBM compatible 1/2" open reel tape. This is almost a universal format, but it is an old format and it is not efficient in the use of tape. It does provide one of the few standards we have in computing.

The hardware supplied by Electrovalue worked perfectly as soon as it was connected and turned on. The drives can be any Pertec compatible 800 BPI tape unit, this type of drive was made by Pertec, Cypher, Perkin-Elmer, and Wango. They are available on the used market, as well as some brand new ones available on the surplus market.

The Electrovalue controller unit is designed for Apple II and runs on DOS 3.3 the most popular and standard operating system for Apple computers. It would be very nice if the tape reading and writing programs were converted to PRODOS because of the advantages of that system. However, as far as the data is concerned, it makes no difference. In fact the data could even be transferred to CP/M by using the DOS to CP/M routine commonly available.

The unit comes with several programs and loose leaf manual filled with information. It is an excellent manual for a unit of this type. The controller is plugged into any available slot in the Apple, booting the computer with the DOS disk supplied and running a program called SUBS. The hardest task for the user is stringing the tape. Unless you are familiar with open reel

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Appleworks Continued From Page 45

ENDS WITH, DOES NOT CONTAIN, DOES NOT BEGIN WITH, and DOES NOT END WITH) are available in three different select modes (AND, OR, and THROUGH). You can select all of the first names which begin with "A" and don't contain "Mac" in the last name, and where the area code equals "212" or "718" or where the zip code is between "10001", and "11899". Sorts can be alphabetical, reverse alphabetical, numerical, reverse numerical, chronological, or reverse chronological order.

The spreadsheet is a RAM resident "VisiCalc like" calculator. It will read VisiCalc files directly (although they do have to be converted to ProDOS first). The calculations are carried out to 15 digit accuracy, enough to calculate figures up to $999,999,999,999.99 without losing accuracy. The user sheet is a massive 127 columns by 999 rows! The 6000 cell memory limit (128K machine) is adequate for almost all possible applications. Horizontal and Vertical windows are both supported, as well as variable column widths. Value formats include: FIXED (decimal mode), DOLLARS (dollar sign, 2 decimal places), COMMAS (automatic commas every thousandths place), PERCENTS (automatic percents), APPROPRIATE (where the system accepts the data in the manner which you input it), and STANDARD (defaults to whater was chosen for the entire sheet). Exotic functions include: @NPV (interest rates), @CHOOSE (function table), and @LOOKUP (lookup table), among others.

The word processing functions are quite excellent for most users. Standard functions include global search/replace, footnotes, block moves, multiple line spacing, etc. But the word processing is the module where I'd especially like disk buffering. A 128K Apple is limited to about 25 double spaced pages - enough for letters, articles, and short stories, but not enough for a novel.

Although Appleworks is excellent for most users, it is not powerful enough for users who need an extremely powerful

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Listing #1

```
2  REM  THIS PROGRAM MODIFIES THE APPLEWORKS STARTUP DISKETTE
3  REM  FOR USE WITH VARIOUS PRINTER INTERFACES.
4  REM  USE ONLY WITH APPLEWORKS VERSIONS 1.0 AND 1.1
5  REM  DO NOT USE WITH VERSION 1.2 (NOT NECESSARY)
10  TEXT : HOME
20  D$ =  CHR$ (4)
30  PRINT D$;"PR#3": PRINT
40  PRINT "AppleWorks Interface Card Configuration Utility";
50  POKE 36,69: PRINT "Version A02";
60  PRINT "Copyright Apple Computer, Inc. 1984";
70  POKE 36,67: PRINT "July 13, 1984";
80  VTAB 6: PRINT "This utility allows you to configure a copy of ";
90  PRINT "the AppleWorks Startup disk to"
100  PRINT "work with several parallel interface cards. ";
105  PRINT " Important notes:"
110  PRINT : PRINT "- DO NOT USE YOUR ORIGINAL APPLEWORKS STARTUP ";
120  PRINT "DISK; Use this utility only on"
130  PRINT "  a backup copy (an exact copy) of the AppleWorks ";
135  PRINT "  Startup Disk."
140  PRINT : PRINT "- DO NOT USE THIS UTILITY IF YOU HAVE AN APPLE ";
150  PRINT "II PARALLEL INTERFACE CARD"
160  PRINT "  (A2B0021) OR FULLY COMPATIBLE CARD.  AppleWorks prints ";
170  PRINT "properly on these"
180  PRINT "  cards without modification.  A disk that has been ";
190  PRINT "configured with this"
200  PRINT "  utility will no longer run correctly with the Apple II ";
210  PRINT "Parallel Interface"
220  PRINT "  Card."
230  PRINT : PRINT "- Apple cannot guarantee that this utility will ";
240  PRINT "make AppleWorks compatible"
250  PRINT "  with any given parallel interface card. ";
260  PRINT "The only reliable way to check"
270  PRINT "  compatibility is to test your configured AppleWorks ";
280  PRINT "  with the card in"
290  PRINT "  question.  For additional information, see your ";
300  PRINT "authorized Apple dealer."
310  VTAB 4: FOR I = 1 TO 80: PRINT "_";: NEXT I
320  VTAB 22: FOR I = 1 TO 80: PRINT "_";: NEXT I: PRINT
330  VTAB 24: PRINT "Press RETURN to continue or ESCAPE to stop. ";
340  INVERSE : PRINT " ";: NORMAL : PRINT  CHR$ (8);
350  IF  PEEK (49152) < 128 THEN 350
360  IF  PEEK (49152) = 155 THEN  POKE 49168,0: TEXT : HOME : END
370  IF  PEEK (49158) <  > 141 THEN 350
380  POKE 49168,0
390  POKE 34,4: HOME
400  VTAB 22: FOR I = 1 TO 80: PRINT "_";: NEXT I: PRINT
410  GOSUB 10000
1000  POKE 49168,0
1010  HOME
1020  VTAB 11
1025  PRINT "Remove the AppleWorks Interface Configuration Utility"
1030  PRINT "from the disk drive."
1040  VTAB 14: PRINT "Place your COPY of the AppleWorks STARTUP disk ";
1050  PRINT " in Drive 1."
1060  VTAB 24: PRINT "Press RETURN to continue or ESCAPE to stop. ";
1070  INVERSE : PRINT " ";: NORMAL : PRINT  CHR$ (8);
1080  IF  PEEK (49152) < 128 THEN 1080
1090  IF  PEEK (49152) = 155 THEN  POKE 49168,0: TEXT : HOME : GOTO 10
1100  IF  PEEK (49158) <  > 141 THEN 1080
1110  HOME : VTAB 12: HTAB 26: PRINT "Configuring AppleWorks Disk"
1120  POKE 49168,0
1130  ONERR  GOTO 2000
1140  PRINT D$;"BLOAD /APPLEWORKS/APLWORKS.SYSTEM,A$2000,T$FF"
1150  POKE 11556,MA(1): POKE 11557,MA(2): POKE 11558,MA(3)
1160  POKE 11559,MA(4): POKE 11560,MA(5)
1170  POKE 12902,71
1180  PRINT D$;"BSAVE /APPLEWORKS/APLWORKS.SYSTEM,A$2000,L6499,T$FF"
1190  HOME : VTAB 12: HTAB 33: PRINT "Configuration Successful"
1200  VTAB 18
1205  PRINT "To configure another copy, replace the disk in Drive 1"
1210  PRINT "with another copy of the AppleWorks Startup Disk."
1215  GOTO 1060
1220  DATA  3,137,176,206,0: REM (String length)(CTRL-I)(ZERO)(N)(null)
1230  DATA  4,137,185,185,206: REM       (length)(CTRL-I)"99N"
1240  DATA  2,137,206,80,80: REM         (length)(CTRL-I)"N"
1250  END
2000  POKE 216,0
2010  IF  PEEK (222) = 8 THEN 2040: REM   I/O ERROR
2020  IF  PEEK (222) = 6 THEN 2080: REM   COULD NOT FIND FILE
2030  IF  PEEK (222) = 4 THEN 2130: REM   DISK IS WRITE PROTECTED
2040  HOME : VTAB 10: PRINT "Cannot read your Disk": PRINT
2050  PRINT "Make sure that you have a copy of AppleWorks in the"
2060  PRINT "drive, and the drive door is closed"
2070  GOTO 2160
2080  HOME : VTAB 10
2090  PRINT "Cannot find the disk or file that requires changing."
2100  PRINT "Make sure you have a copy of the AppleWorks STARTUP"
2110  PRINT "disk in the drive and the drive door is closed."
2120  GOTO 2160
2130  HOME : VTAB 10: PRINT "Your disk is Write Protected.": PRINT
2140  PRINT "Remove the Write Protect Tab from your disk."
2160  POKE 34,23: HOME : POKE 34,4
2170  VTAB 24: PRINT "Press RETURN to continue or ESCAPE to stop. ";
2175  INVERSE :PRINT " ";: NORMAL
2180  IF  PEEK (49152) < 128 THEN 2180
2190  IF  PEEK (49152) = 155 THEN  POKE 49168,0: GOTO 10
2200  IF  PEEK (49152) <  > 141 THEN 2180
2210  POKE 49168,0
2220  HOME : GOTO 1040
10000  REM   MENU FOR INTERFACE CARD SELECTION
10010  POKE 35,24: RESTORE
10020  VTAB 9: HTAB 30: PRINT "1. Grappler or PKASO"
10030  VTAB 11: HTAB 30: PRINT "2. TYMAC OR Microtek"
10040  VTAB 13: HTAB 30: PRINT "3. Practical Peripherals"
10050  VTAB 15: HTAB 30: PRINT "4. An interface card not named here"
10060  VTAB 24: PRINT "PLEASE SELECT:          ESC to exit selection";
10070  FOR I = 1 TO 29: PRINT  CHR$ (8);: NEXT I: INVERSE :
10075  PRINT " ";: NORMAL
10080  IF  PEEK (49152) < 128 THEN 10080
10090  A =  PEEK (49152)

10100  IF A = 177 THEN 10160
10110  IF A = 178 THEN 10170
10120  IF A = 179 THEN 10190
10130  IF A = 180 THEN 10210
10140  IF A = 155 THEN  POKE 49168,0: GOTO 10
10150  GOTO 10080
10160  FOR X = 1 TO 5: READ A:MA(X) = A: NEXT X: RETURN
10170  FOR X = 1 TO 5: READ A: NEXT X: PRINT "#"
10180  FOR X = 1 TO 5: READ A:MA(X) = A: NEXT X: RETURN
10190  FOR X = 1 TO 10: READ A: NEXT X: PRINT "##"
10200  FOR X = 1 TO 5: READ A:MA(X) = A: NEXT X: RETURN
10210  HOME
10220  VTAB 22: FOR I = 1 TO 80: PRINT "_";: NEXT I: PRINT
10230  POKE 35,21: HOME
10240  POKE 49168,0
10250  PRINT : PRINT "This selection is for use only if one of ";
10260  PRINT "the other selections will not work"
10270  PRINT "with your interface card."
10280  PRINT "If you do not have one of the listed cards, try the"
10290  PRINT "different selections first, many interface cards work ";
10300  PRINT "in the same way.": PRINT
10310  PRINT "If after trying all the selections your interface card ";
10320  PRINT "still does not work, use"
10330  PRINT "this selection.  Enter a sequence to initialize your ";
10340  PRINT "interface card.  It can"
10350  PRINT "be up to 4 characters long, and should make your ";
10360  PRINT "interface card turn off screen"
10370  PRINT "output and print 80 columns."
10380  PRINT
10390  VTAB 15: PRINT "Number of Characters (1-4) :      (ESC to exit)";
10400  FOR I = 1 TO 18: PRINT  CHR$ (8);: NEXT I: INVERSE : PRINT " ";
10410  NORMAL : PRINT  CHR$ (8);
10420  IF  PEEK (49152) < 128 THEN 10420
10430  A =  PEEK (49152)
10435  IF (A < 177 OR A > 180) AND A <  > 155 GOTO 10420
10440  IF A = 155 THEN  POKE 49168,0: GOTO 10
10450  MA(1) = A - 176: PRINT MA(1)
10460  POKE 49168,0
10470  FOR I = 1 TO MA(1)
10480  PRINT "Decimal equivalent of character "I" :";: INPUT "";MA(I)
10490  NEXT I
10500  PRINT : RETURN
(end)
```

MACINTOSH

ThinkTank 128 Review

by L.J. Kutten
ThinkTank 128
ThinkTank 512
Living VideoText, Inc.
2432 Charleston Road
Mountain View, CA 94043

Suggested Retail:
ThinkTank 128 - $145
ThinkTank 512 - $245

Overview: ThinkTank is an idea processor that uses the outline format to help you "brainstorm" plans, organize complex ideas, develop an overall plan, and keep track of projects.

Each ThinkTank outline is composed of numerous headlines. A headline can be indented so that it is subordinate to the one above it. Each headline has a leader in front of it; either a "+" or a "–". A "+" means the idea has one or more subordinate headlines indented to the right underneath it while a "–" means the headline has no subheads. This arrangement allows the user to put his or her ideas into a very flexible format that can be expanded and contracted.

A typical session with the program might go like this. You have to plan a meeting for your local Macintosh user group. There are three main topics to cover. You start the ThinkTank outline by listing the three topics: the group's library, finances, and a membership drive. The outline might look something like this:

+ Next meeting
  – library
  – finances
  – membership drive

As you review each topic, you would think of additional points that need to be covered: e.g.:

+ Next meeting
  + library
    – how many disks stored
    – who has possession
  + finances
    – current dues
    – bank balance — how large?
  + membership drive
    – booth at local computer show
    – advertising cost?

Each section can be further expanded. If you do not need to view a certain section, you merely double click on its superior headline (the one with a "+") and any subordinate headlines (the ones with the "–") disappear. For example, in the above headline, if you double clicked on the line "+ finances," the outline would look as follows:

+ Next meeting
  + library
  – how many disks stored
  – who has possession
+ finances
+ membership drive
  – booth at local computer show

If you double click on the headline "+ Next meeting," the entire outline would close up. Unfortunately, there is no reverse of this command. It would be very useful if ThinkTank has a universal open command.

ThinkTank also allows you to easily move each headline around so that the idea being outlined can be more logically developed. Other features include the ability to sort subordinate headlines, finding and replacing text, and changing font size so you can view more material on the screen.

Using the Program: ThinkTank is very simple to use. There are only six main commands to master:

– double click mouse
– drag mouse
– enter new headlines
– expand and collapse outlines
– rearrange text
– keyboard move commands

In less than 60 minutes after I opened the package, I was fully utilizing it. Within 90 minutes, I felt like an old pro with it. The program is so easy and useful that I now use it before I write any articles. Before ThinkTank I hated to prepare an outline; it was so difficult to prepare. I would just sit down in front of my friendly word processor and type away. That method of operation required many drafts as I polished and organized my thoughts. With ThinkTank, I can easily prepare a detailed outline before I start writing.

As an additional "goody," the ThinkTank outline is compatible with MacWrite. The outline can be copied to the Macintosh Clipboard. From there it can be copied onto a Macwrite document. The only problem with this is that it requires a minimum of five disk swaps on a one drive Macintosh. If you do a lot of such transfers, get a second disk drive.

To run ThinkTank, the master disk must be in the Mac's internal disk drive; it will not work in the external drive. However, the outlines themselves can be stored on a data disk in the external drive. According to the publisher, ThinkTank is compatible with either the Corvus or Davong harddrives. It may work on other harddrives but there is no guarantee from the publisher.

The manual: ThinkTank's weakest point is its manual. It is 48 pages and contains a three-page index. It provides adequate instructions on how to use the program. It is not to the same high standards as the program. For example, the manual tells the user to first start by double clicking the "Sample" outline icon. While there were five outline icons stored in a folder called outline, none were called "Sample" on my disk. By trial and error I discovered the "Sample" outline had been renamed "Baseball." Once I got past that, I had trouble generating subordinate headlines. Subordinate headlines (a "–") are generated by moving headlines that are underneath another headline to the right. The manual instructs the user how to move the headlines but never comes out and says why this is important. Again by experimentation, I found out why.

There are two versions of ThinkTank available. ThinkTank 512 is identical to ThinkTank 128 except can open an area for storing text and graphics in the outline. You can use MacPaint, MacWrite, MicroSoft's Chart, and other programs to call pictures and text into an outline.

ThinkTank comes on a copy protected diskette. Once you register with the manufacturer, another master diskette will be sent to you. If you already have ThinkTank 128, you can upgrade to ThinkTank 512. Since last December, Living VideoText has been mailing an upgrade kit to all registered owners. To upgrade, you must fill out the upgrade kit, return one program diskette and the manual to Living Videotext, and send a check for $103. In return, Living VideoText will send you the ThinkTank 512 package.

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Data-Based Information Management And Decision-Support System For Apple Macintosh

Odesta Corp. has begun its Helix software product for Apple's Macintosh personal computer. A data-based information management and decision-support system, Helix provides complete database capabilities, allows the development of customized applications and simplifies the analytical process.

The program performs the traditional database management tasks of filing, sorting and retrieving information as well as complex analysis and modeling tasks. Even those unfamiliar with computers can use Helix to set up a database, enter information and perform searches without concern for parameters or commands. Having gained some familiarity with the program, users can create applications specific to their needs, from sales analysis to exception reporting.

Data-Based Decision-Support System

Because Helix combines a fully functional database management system with the capabilities of a decision-support system, information can be entered into Helix just once for a variety of purposes, from inventory control to resource management.

A magazine publisher, for example, could use Helix to track renewal frequencies, seasonal variations, reader demographics and geographic penetration. Using the same data in a different context or with a different application, that publisher's circulation department could use Helix to analyze subscription rates or manage the mailing list.

The program is extremely flexible—databases can be structured according to the user's needs and, once created, can be changed easily. Helix handles both text and numbers. And, unlike most other database programs, Helix may be queried as questions occur to the user.

Rapid Application Development

Helix contains various graphic symbols, called icons, that represent every functional operation, including logical functions—the building blocks of an application. These icons can be linked together in a visual flow chart, with data taken from any related file. This gives those using Helix a quick way to set up data relationships and calculations that can be tailored into an application for a specific industry. A number of sample applications are included with the package.

Icons allow both computer novices and sophisticated users to quickly master basic filing and retrieving of information. As users achieve greater familiarity with the program, they can develop a range of applications from cash-flow tracking to order-fulfillment systems.

Full Use of Macintosh Interface

The Apple Macintosh personal computer, with its icons, "mouse" pointing device, windows and pull-down menus, has substantially decreased the amount of time and frustration a person faces when using a software package. Helix takes full advantage of this accessible environment.

Users interact with Helix by pointing the cursor and clicking the mouse on icons representing various program functions. Even complex calculations can be set up with the icons. This use of icons eliminates the need to learn programming languages of command codes.

Different files can be seen in

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Rapping With Racter

(Heart to Heart with a Computer)

by Brenda Rodriquez
and Jon Wettingfeld

We were able to test-run and converse with the first commercial release of this already widely known "artificial writer." What does a talking computer have to say to "soft humans...?" Read on...

You might not believe this unless someone you trusted told you, but you can have a "heart to heart" talk with your computer. No, it's not a scenario with Hal from "2010", but a release of a cordial conversational program called "RACTER."

Actually, Racter (short for raconteur) alresdy has claim to fame as the author of the first book ever written by a computer (The Policeman's Beard is Half Constructed, Warner Paperback Books).

It's authors (behind every great program stands a great human) William Chamberlain and Thomas Etter have also seen their prodigy's output of stories, jokes, poetry and limericks become the subject of an exhibit at New York's Whitney Museum. And some of Racter's work has also appeared in Omni magazine.

While the story is understandably hard to believe, recall that Eliza, developed in the sixties at MIT had already set the stage for personal computer coversationalists (though not as a writer, but as a silicon psychotherapist). In any case, the proof is in the output, and we were anxious to get started with our interviewing. How well would the program run "in the field" in its first commercial release? Did Racter the cybernetic Shakespeare really have a distinctive stylish flair? Or just a good editor to touch up his printouts?

Racter: Design and Technical Specs

Racter is written in Microsoft Compiled Basic. Originally implemented on an IMS Z80 machine, it was non-interactive, with the exception of three of its pieces published in the "Policeman's Beard" collection. New interactive techniques, giving the program an "interview" format, much like Eliza, were added when Racter was programmed to run on IBM PC and PC lookalikes. The current version is supplied on an IBM 5¼" disk, with 320K capacity under PC-DOS 1.0, and operable on both DOS 1 and 2.

According to programmer Bill Chamberlain, the fully interactive runtime module was too large (32k vs. 16k in the original Z80 version) to be successfully implemented on a 64k Z80 machine. It was decided instead to make Racter available, initially, on the IBM PC, which handles the heftier program (and accompanying files) in stride. INRAC Corp. is currently re-writing the interactive version in Forth, and hopes to bring it down to a manageable size, for use on the 8-bit systems which still have the lion's share of the home and recreational computer market - Apple and Commodore.

Racter has been described as an "artificial writer", or prose synthesizer system. What Racter says is not as important as the fact that he says it grammatically. Accordingly, the program can conjugate verbs, both regular and irregular, realize the singular and plural of regular and irregular nouns, and remember noun gender. It also assigns variable status to randomly chosen words, clause or sentence forms, as well as to paragraph and whole story forms.

According to Chamberlain, one completely unique feature of the program is this use of variables chosen via a "random number seed." Rather than stiltedly substituting particular words or phrases for one another in a larger pre-defined body of prose, Racter creates the WHOLE body of prose, sentences and paragraph forms, from the "elemental building blocks" of grammatical and syntactical rules - not to mention choices from Racter's delightfully eclectic vocabulary. (In what other program but Racter would you find Pollianna, fanatical cosmologists, conic sections, Walter Mondale, and Jane Fonda in your output?)

This "from the ground up" program design allows the rules of English to be resident in the computer, while the programmer, or end-user is "removed from the system output." The output is then formed as Racter moves between its files - the names of which reflect its underlying organization: "Vocabulary 1 & 2," "Stories," "Jokes," etc. This kind of output is neither preprogrammed, nor knowable in advance; and the author calls it "prose not contingent on experience."

A crucial aspect of the program operation, along with random-driven and completely grammatical prose synthesis, is the apparent ability to stay on a subject. Racter provides this by retaining some variables, and then equating them with others. That this provides what's been called "crazy thoughtfulness" in the output was repeatedly demonstrated in our interviews. For instance, Racter remembers previous conversations, as well as the name of the last person it spoke to. It will also joke or philosophize about a subject it finds "interesting."

Installation

Racter comes ready to run on your IBM PC, or PC lookalike. We couldn't get it to run on the PCjr (128k version) without hanging up with an error message, but we haven't yet tried it on the expanded (256k) jr. We suspect that memory size is the main problem.

The user simply boots the machine, inserts the disk in either A or B and types RACTER<return>. (It should also be possible to access Racter via an AUTO.EXE file, though we didn't try this.)

While Racter is copy-protected, and must be run on the original program disk, all of it's files can be backed up by using COPY to bring them over to a formatted disk. Then, in case you damage your original disk, you can simply re-copy the files onto the original master, and make Racter fully functional again. (Since whatever "finger print" information Racter looks for is not readily accessible to DOS, the "hidden" data isn't likely to be damaged - unless by some misfortune you reformat the disk.) The disk, incidentally, is not write-protected, since Racter's "conversations" go on record in the form of a "RACTER.OUT" text file.

This means that you have the option to print screen (Cntrl P) while you are conversing, or you can TYPE and print the RACTER.OUT as a DOC file when needed. We found it convenient to keep a log of all our conversations by copying updated Racter output files to a single empty disk, and then renaming each file in sequence (RACTER.1,2, etc). Each file can then be dumped to a printer when convenient.

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SoftForms Software Review

by L.J. Kutten

SoftForms
Artsci, Inc.
5547 Satsuma Ave.
North Hollywood, CA 91601

Suggested retail price $39.95

SoftForms is a series of MacPaint files containing commonly used business and personal forms: balance checkbook form, bank account and credit card record keeper; call report; credit application; customer invoice; employment application; follow-up memo; graph paper; inventory report form; monthly calendar; payment reminder; purchase order; receiving record; routing form; speed memo; speed gram; telephone memo; things to do list; three-column accounting paper; time and material invoice; and weekly reminder.

Since they are MacPaint files, each form can be customized to fit any user's particular application. For example, a company logo, address, or telephone number could be added.

The utility of SoftForms will depend solely on the user's need or desire to customize the MacPaint files. If a user intends to use the forms "as is," it will be far cheaper for him or her to go to a local office supply store or quick print shop and buy the preprinted forms (my local quick print shops gives telephone memo pads and things-to-do list away free). However, if the forms are modified, SoftForms can save the user money and time as it is cheaper and quicker for him or her to do the customization than pay someone else to do it.

The program manual is rather complete. It tells you how to make backup copies, load the program, and even provides tips on how to best utilize the program. It gives suggestions on when to use printout of individual forms, when to photocopy them, and when to have a local print shop duplicate them.

SoftForms comes on a non-copy protected diskette, includes a 20-page manual and a warranty card that allows the user to order a backup or replacement disk for $20. SoftForms will work on a one disk drive Macintosh but unless the user wants to do a large number of disk swaps, two drives are recommended—one to hold the MacPaint program and systems files and the other to hold the SoftForms data files. ●

illustration 1

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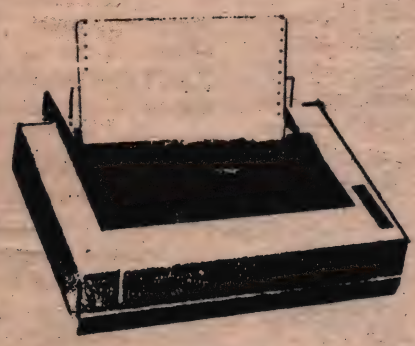

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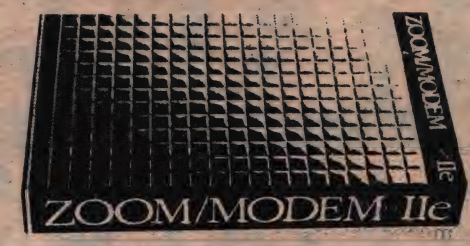

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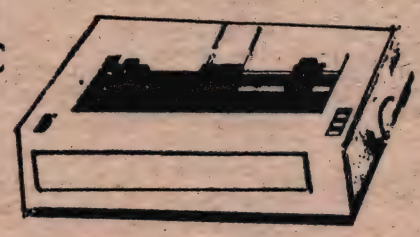

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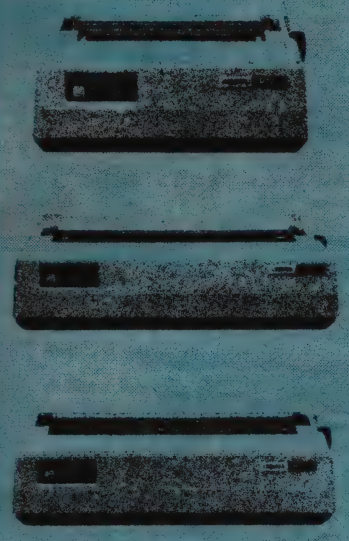

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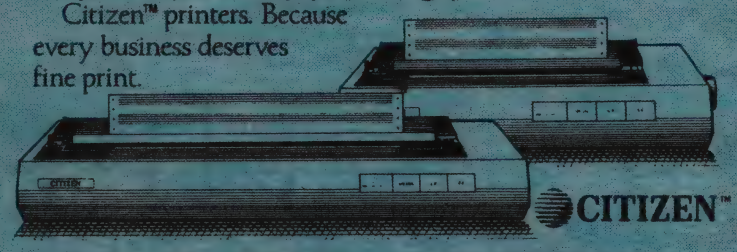

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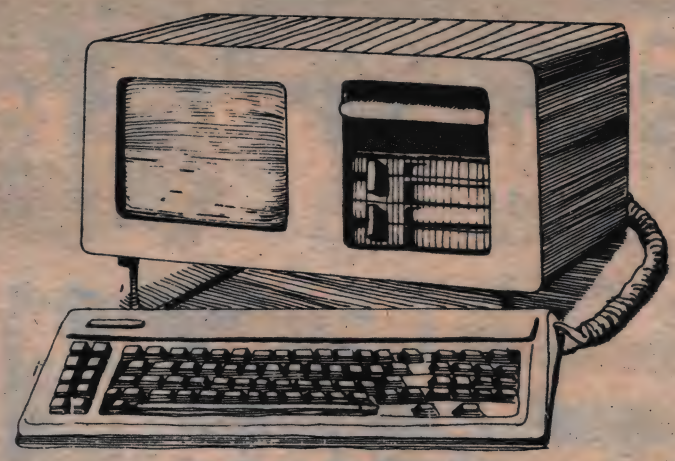

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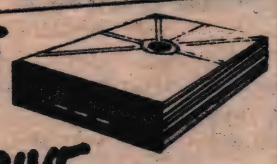

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COMMODORE

Building a Parallel Printer Interface

by Ted Drude

Build It Yourself:
An Inexpensive Parallel Printer Interface for the VIC/64

We've heard your requests for a simple, yet practical, hardware construction project. Here's our response: **A cheap Centronics parallel printer interface for the VIC-20 and Commodore 64!**

The price for the interface runs about $25 or less and all of the parts are easily obtainable. They can be found at a Radio Shack store or from several mail order firms that advertise in the **Computer Shopper.** You don't have to be an electrical engineer to build it either. With a little soldering and some minor electronic construction, you should have a working interface in a few hours.

This month we'll layout the schematics, parts list, and steps of construction. We'll also take a peek at the circuitry inside the VIC/64 that drives it.

Before we begin, though, let's lay a little groundwork. Some people are a little confused about what a parallel interface is, why it is called a "Centronics" interface, and why they need one for their VIC or 64. Let's straighten out a little of the confusion.

Parallel vs. Serial Interfaces

First, a parallel interface allows an 8-bit data transfer across 8 wires simultaneously instead of in a serial fashion (one bit after another) as the RS-232 and Commodore serial interfaces do. This makes for faster data transfer. Although it takes 8 wires (plus a couple more for "handshaking" signals) for the interface to work, instead of the 2 or 3 a serial interface uses, the electronic part of the parallel interface is actually less complicated in its design. That simplicity translates into cheaper, easier to install, and more reliable interfaces than serial ones. For short cable lengths (less than 10 feet or so), the parallel interface is the best one to use.

Why "Centronics?"

The reason the interface is called the "Centronics" interface is because the Centronics company first developed it for use in their line of printers. Shortly after its introduction, it became the "generic" industry standard parallel interface, just as the RS-232 became the generic serial interface. Since the mid to late '70s it has been available on about 90% of all the printers on the market. This makes it an interface that allows hundreds of different printers to work with computers from various manufacturers with little or no compatibility problems.

Do You Need A Parallel Interface?

If you are going to use Commodore, and only Commodore, printers, you really don't need a parallel interface. It wouldn't work anyway! Unfortunately, Commodore didn't see fit to put a Centronics parallel port interface on its computers. Instead, they adopted the rather odd, but technically sophisticated, IEEE-488 bus for their business line of computers.

When the VIC-20 and 64 came out, they elected to develop their own proprietary serial bus (loosely based on the "488" system) for peripherals interfacing instead of using existing standards. That locks the average Commodore user out of most "third party" printers and peripherals (thank you, Uncle Jack).

Commodore's printers and disk drives use a built-in custom serial interface that connects on the back of the keyboard unit. Commodore, like every manufacturer, wants you to choose their own brand of peripherals when you expand your system. Their choice of a "proprietary" interface is a little "help" in that direction. (Most low end/home computer manufacturers have done the same thing: Atari, Radio Shack, Texas Instruments, and even the much-heralded MSX. So Commodore is not a lone culprit here.)

The newer Commodore printers, such as the 1526, and the 802 do a good job for most purposes, and the Commodore serial bus works just fine for them. But there are many other printers that are faster, cost less, or have more features, etc., than what Commodore offers, and some of us would like to be able to use them.

For example, Commodore still does not sell a letter quality printer that works with their own serial bus! So, if we want a letter quality printer, we were supposed to be "good kids" and wait for the new model that they promised us 6 months ago, right? Well, owners of some other brands of computers might accept that, but most Commodore owners I know are a little more independent and almost shamefully pragmatic. If there were a nice, inexpensive Commodore letter quality printer available now, we might buy one. Until then, most of us won't think twice about buying some other companies printers.

(Which leads me to make the assertion that the reason so many Star Gemini 10s are hooked-up to Commodores today is because Commodore was so ridiculously slow in delivering reliable 1526s to begin with. I guess they figured everyone would just wait patiently. They lost a lot of sales as a result.)

Making the Centronics Connection

So, let's say you have decided you want to use another brand of dot matrix printer (like Star or Epson), or a daisy wheel printer. You've checked, and sure enough, the non-Commodore printer uses the Centronics parallel interface. Now, how do you get it to work with your Commodore computer? Well, there are several ways, some complex, others simple, some expensive, others are cheap. In this article we are going to look at the cheapest way. Though cheap, this method works fine for the vast majority of your applications. In fact it has some "special features" that are unique to it.

This interface is an inexpensive and practical way to avoid the extra cost of a serial-bus interface device and can make using a non-Commodore printer affordable for your budget. If you use Easy Script as your word processor you get an extra bonus. This interface allows you to take advantage of that mysterious "Centronics interface option" that is referred to in the manual and in the opening menu, but not very well documented. If you are using an Epson printer, you'll find even more benefits! But, before we see how we are going to do it, let's first see how we are **not** going to do it.

The "High Priced Spread"

Many people are only aware of one way of interfacing a parallel printer to their VIC or 64. This way is the only way advertised in most magazines. You probably found out about it if you were new to computers and purchased a non-Commodore printer before you realized it wouldn't directly connect to your machine. About this time, your local Commodore "expert" (maybe a salesman, maybe a "friend") told you, you were "in luck". All you had to do was buy an "inexpensive" serial bus interface for your VIC or 64 and you could connect any of these printers up to your serial port and use it as though it were a standard Commodore printer, including graphics emulation and other features.

The only catch was you had

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Merlin 64

by Cheryl Peterson

Merlin 64
Roger Wagner Publishing
10761 Woodside Avenue, Suite E
Santee CA 92071
(619) 562-3670
Suggested list $49.95

It's very rare for me to find a software program about which I can make NO complaints. Merlin 64 is such a program. The two copies that I received arrived about five months apart. The only deficiency I saw in the first version was that the documentation was a 9" three ring binder that was a hassle to use with one hand. The second version came with a beautifully bound paperback manual. The information was basically the same; the package it came in had been much improved.

As long as we're on the subject, the documentation for the program is excellent. An abbreviated, but effective, tutorial at the begining gets you right into using the program. The sample used is just long enough to illustrate how the editor and assembler work. Since the program is divided into sections that control disk functions, editing, assembly, and monitoring the finished program: the manual has sections to explain each. The manual has a comprehensive table of contents and is fully indexed. There are also a technical information section and glossary. Wherever appropriate, the manual uses examples or sample routines. The section on macros, for instance, contains several example routines. There is also a macro library on the disk with two example programs to show how macros are used.

Assembly language programming is difficult enough without trying to use an overly complicated or poorly designed assembler. Merlin 64 is neither. The command structure of the program is easy to learn and follows the commonly used procedures that a programmer goes through.

For instance, not every program assembles correctly the first time through. The assembler gives error messages accompanied by the line numbers where they occur. Merlin makes it easy to get back into the editor and fix the problems.

If the program assembles, you can either run the monitor (although this isn't recommended until you've saved the assembled object code) or go to Executive mode and save the source and object code. Merlin performs the two saves independently.

Here again the program shines. When saving the source code, Merlin remembers the last filename used. You can either write over the former file, or type in a new name. Before doing the save, Merlin asks if you wish to update the

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Building a Parallel
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to spend $50-100 for the interface. If you'd already spent $200-300 or so for the printer, the interface might not have seemed quite as "inexpensive" as the "expert" said it was. It seemed there should be a better, and less expensive, way. Indeed there is. It requires a little work, but it is just as good as the "high priced spread" most of the time. Let's look at the standard interfaces a little more closely to see what is going on and what some of our alternatives are.

Because of its popularity, commercial Centronics-compatible parallel interfaces have been available for Commodore computers for quite a while. These interfaces generally plug into the serial bus connector of the computer on one end, and then provide a Centronics parallel connector on the other. In the middle, unseen by most users, is a complex interface circuit that often includes a complete microprocessor system with its own CPU, RAM, and ROM. No wonder the interface cost $100, it's got a complete microcomputer inside! You might assume that this complexity is required simply for the system to operate a parallel printer...it isn't. The truth is, the job can be done effectively with less hardware, at a lower cost, and with a lot more flexibility.

The reason that parallel interfaces are so complex is the amount of "bells and whistles" or added features put in them. For example, most of the more expensive interfaces attempt to emulate Commodore graphics characters on whatever printer they are connected to. That's fine if you are doing a lot of graphics work. But, many of us just want simple text, especially if we're printing on a daisy wheel printer which can't print graphs anyway. So, a lot of the advanced features of the expensive interfaces are often unused. One manufacturer has finally realized this and now offers a "cheap" interface for around $50 for non-graphic printers.

In reality, most of the features that the expensive interfaces provide in their high priced hardware could be duplicated in inexpensive software. Many times all of their "features" are nothing more than fancy print driver programs being run by the interface CPU. For example, in order to use some of the interfaces with more than one brand of printer you have to buy a different interface ROM for it to work properly. That's because the interface print driver program is in ROM and it has to be customized for each different brand of printer. This just adds to the cost of a supposedly "intelligent" peripheral.

The main advantage of this type of interface is convenience. You don't have to load a print driver program from disk to use it, it's there when you "power on". The dedicated interface also may work with some heavy copy-protected programs when other methods won't. As in everything, convenience has it's price and those who can afford it will pay. Those who can't, will play (and learn while they're doing it)!

The "Other" Way

Now that we've seen the high priced way to interface, let me describe the alternative we're presenting. This method uses an inexpensive ribbon cable/Centronics connector adapter to connect a standard Centronics printer to the parallel User's Port found on the VIC and the 64. The User Port is a hardware parallel port, but it's not configured for the Centronics standard. With some cable and a couple of connectors, this is easily rectified.

In addition to a hardware interface, you'll need some software to run the printer. Later we'll be looking at a software driver program that allows you to operate a parallel printer using the normal BASIC 'OPEN', 'CMD', and 'CLOSE' commands, building on our understanding of the KERNAL. With this interfacing method, custom programmed printer drivers can be soft loaded into the 64. No need for ROMs or other expenses. With this system, if you want to change printers or print features, you can merely load a new printer driver from disk. This means that instead of being stuck with the result of someone elses ROM for your printer output, you can make custom printer mods yourself! Now you can get in there and hack away on a level that is impossible with the "high priced spread".

To a large degree, the interface is "transparent" to software. Easy Script, for example, works perfectly with it. It works fine with BASIC and most properly written Assembler program when using with the right software driver. Some commercial programs will not access the parallel printer properly, but many can be made to work with some minor modification. This method also allows you to have a Commodore serial printer connected to the serial port along with the parallel printer. You can selectively send output to either the serial bus printer or the parallel printer and freely switch between the two.

The only real disadvantage to this system is that it ties up the User Port. If you are already using your User Port for RS-232 interfacing or a modem, you won't be able to use a parallel printer at the same time. Few people are in this predicament, however. I have heard some slight objections to using the User Port from those who like to have their printers on-line while they are using their modems. This system, of course, won't work with that. Personally, I think it's better to save all your text to a disk file while you're on-line, then print it out later while your off-line. It's a lot quicker and will save on your phone bill!

(If there is enough interest, we might work up a circuit that operates just like this one only **doesn't use the User's Port.** Instead, it would require a circuit board attached to the Expansion interface and add another interface adapter chip. It's more complex, and would cost about $15 more. For most applications this interface will work fine.)

The Schematic

The User Ports on both the VIC-20 and the C-64 are connected to internal IA (Interface Adapter) chips. These chips provide all the electronics needed to drive the interface. With this interface, we are merely cabling the User Port to adapt to a Centronics Port. All the rest handled through software.

The interface is compatible with both the VIC and the 64. This necessitates using the same connector pin-outs on the computer end of the interface for both machines. There are several differences between the two User Ports. This stems primarily from the fact that the interface chips inside the VIC and 64 have been wired up a little differently in each model. I am not sure of the reasons why. Fortunately, using software, we can make them compatible with each other and use the same cable on both machines.

Even though the cables can be the same, programming the interface chips will be different. This means the software driver programs will be different for the VIC and the 64. This is due to the fact that the VIC is using a 6522 VIA (Versatile Interface Adapter) and the 64 is using a 6526 CIA (Complex Interface Adapter). I like the VIA better for this application, but the CIA just works fine.

For guidance as you build this project, I suggest that you refer to the schematics and the User Port pin-outs in the Programmer's Reference Guide. The specific ones that will be the most help are on page 241 of the VIC Guide and page 397 of the 64 Guide. You will have to make sure that you are making the proper connection to the right pins on the User Port connector. I had to remove the case from my 64 in order to determine the proper left-to-right hand perspective on the port. The numbers in the diagrams are from the perspective of looking at the edge of the User Port connector from the rear of the computer. Looking carefully at the diagrams will help.

The exact details of the schematic are provided for the technically curious. You don't have to know all the details to build a working interface and some of you might want to skip ahead and avoid this little discussion. Here is a table that gives you the chip pins, and the User Port pins we'll be using, and the corresponding Centronics pins, for both the VIC and the 64:

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IA Chip #		User Port #	Centronics #	- Name
VIC	64			
PB0	PB0	C	2	Data bit 0
PB1	PB1	D	3	Data bit 1
PB2	PB2	E	4	Data bit 2
PB3	PB3	F	5	Data bit 3
PB4	PB4	H	6	Data bit 4
PB5	PB5	J	7	Data bit 5
PB6	PB6	K	8	Data bit 6
PB7	PB7	L	9	Data bit 7
CB1	FLAG	B	10	Acknowledge
CB2	PA2	M	1	Data Strobe
Gnd	Gnd	A,N,1,12	19	Ground

Mr. Pixel's Programming Paint Set and Cartoon Kit

by Cheryl Peterson

Mr. Pixel's Programming Paint Set
Mr. Pixel's Cartoon Kit
Pixelworks, Mindscape Inc.
3444 Dundee Road
Northbrook, IL 60062

Commodore 64 with disk drive
Educational Packages —
Ages 8 and up

Suggested list — $34.95

These two programs both use a joystick and a picture menu to draw and manipulate figures on the screen. The Programming Paint Set (PPS) uses a crayon to draw pictures, while the Cartoon Kit (CK) lets you draw sprites and move them around. By using the two together, you can paint a background picture with PPS and then use the CK to animate characters on it. The programs come with samples on the disks.

For clarity let's start with the PPS. The joystick is used to move a cursor around the menu on the bottom of the screen. The commands consist of icons that you position the cursor over. When the cursor is at a particular icon, it will blink and a beeping sound lets you know where you are. This is a good thing because the cursor is ridiculously difficult to see. Pressing the fire button on the joystick activates the icons function.

Although there are nineteen icons, only six can fit on the screen at a time. Special arrows located at the sides of the screen allow you to scroll the icons left or right until the one you need is present. Unfortunately, the icons menu doesn't wrap around. This means that when you need to use an icon located on the right (like the save and load icons), after you finish you have to go all the way back to the left to use the cursor positioning icons. This is a tremendous discouragement of the normal practice of backing up your work frequently.

As I mentioned, the icons control the movement of the crayon on the page, as well as

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ATARI

Applying The Atari

by Jeff Brenner

This month we've got all the exciting details on Atari's new products, which Atari expects to begin shipping to stores this month. We'll learn how last month's Alarm Clock Program works, have a look at the reader mail and take some programming tips from readers. Also, I'll list the complete version of Program Perfect.

ATARI 520ST PERSONAL COMPUTER

65 XE PERSONAL COMPUTER

Atari News

So, it looks as though Jack Tramiel did keep his promises. With the introduction of the 130ST and 520ST, Atari's first non-8 bit computer products, Atari has shown that it is indeed alive. Let's get a brief run-down of the new units.

The XE Line

Atari describes the XE line as the 1985 Atari XL models. Basically, the 65XE is an 800XL with an attractively redesigned case, a sculptured, high-quality keyboard, and a lower price. The PIO connector of the XL models, which was intended for future hardware expansion, is not included on the XE models. The 130XE has the same features as the 65XE, but contains 128K RAM. The 65XE and 130XE are to retail for approximately $100 and $180 respectively. Other Atari products, announced at the Winter CES in Las Vegas but not as official, are the 65XEM, a 65XE with 8-voice, music synthesizer capabilities, and the 65XEP, a portable XE with a built-in 3.5 inch disk drive and 5-inch screen.

A variety of printers were announced for the XE models, including a dot matrix impact, a letter quality daisy wheel, and a dot matrix thermal transfer printer. The impact and thermal printers offer near-letter quality print styles.

The ST Line

The ST models will no doubt put Atari in the spotlight for 1985. The big question is whether any Atari model can tackle the seemingly impervious Apple Macintosh, even if the ST proves superior and costs a fraction of the price. Also, what happens if and when Commodore brings out its Macintosh-like Amiga computer? The battle is beginning all over again, folks. Whether the ST line is a success or a failure will depend largely upon the quantity and quality of software that is developed for it, as well as Jack Tramiel's marketing strategy.

The 130ST and 520ST offer 128K and 512K RAM (actually 131,072 and 524,288 bytes), respectively. The units use the same MC68000 CPU as the Macintosh, although Atari more accurately calls it a 16/32 bit microprocessor; Apple advertises the Macintosh as a 32-bit machine. The ST models use the CPM/86-k operating system and Graphics Enviroment Manager, developed by Digital Research, to give the icons, pull-down menus, windows and mouse-controlled operation that have brought the Macintosh so much acclaim. The Atari ST brings this all one step further by offering color graphics, a capability not available on the Macintosh. The three graphics modes on the ST consist of a 320-by-200 pixel, 16 color mode, a 640-by-200, four color mode, and a 640-by-400, one color mode.

Other features of the ST models include both an RS232C serial input/output port and a Centronics-type parallel port, a high-speed (1.3 megabytes/second) hard disk interface, monitor jacks for TV, RGB and monochrome, A sculptured keyboard with numeric keypad, a three-voice sound generator and a Musical Instrument Digital Interface (MIDI). Including the MIDI interface was a great idea and may make the ST models extremely practical musician's tools. Many of the newest synthesizers and electronic instruments utilize the MIDI standard.

A 500K, 3.5 inch disk drive will be sold in a separate component for the ST units. A 10-megabyte, 3.5 inch hard disk drive is to be available for the ST for under $600. Utilizing the 1.3 megabytes/second data transfer rate, this drive should be incredible at the price.

Atari has talked about even another computer to be introduced in Hannover, Germany this month. This one is to have a true 32-bit microprocessor and over 1 megabyte of RAM storage (1 megabyte is 1000K). It's surely an Atari product I'm anxious to see.

Reader Mail

Are there any POKE commands which would allow older cartridges (for 400/800 series) to run on an 800XL?

John B. Neff
East Brunswick, NJ

Many older programs for the 400/800 will still run on the XL models, especially software produced by Atari. For those that are incompatible, there are no simple POKE commands to make them work on an XL, but you can get a "translator" disk. This disk gives your XL the operating system of the 400/800 and allows it to run almost all of the older software. It's available from Atari (Customer Relations, P.O. Box 61657, Sunnyvale, CA 94088, Attn: Translator Disk) for $9.95 + $2.50 postage and handling. You can also purchase one from Dynacomp (1064 Gravel Road, Webster, NY 14580) for $5.00 + $3.00 p. & h.

I have run into problems due to the format my writing must be in. Simply, I write scripts, i.e., screenplays. The format demands whole page action description, smaller margin dialog, and approximately centered but left-justified names. My problem is that with AtariWriter, I must continually use control codes for screen directions for action descriptions. The TAB won't work because I don't know of a way to, say, insert a few new lines of dialog later when editing. I think I need an 80-column card (to be able to see exactly where I am tabbing). Do you know where a good 80-column card for the 800XL can be got, or do you have any other suggestions, say in the area of my getting another word processor?

Fred Walters
Oklahoma City, OK

Your use of the control codes to change the printing margins is probably the best way to get the format that you need when using AtariWriter. As you realized, the tab is not appropriate for your needs since you would have to tab at the beginning of each printed line for a dialog of more than one line. During editing, there's no easy way to know where the next line will begin on a 40-column screen.

I assume that your problem is the inconvenience of constantly adding control codes for your ever-changing margins. I see no easier way of doing this with your present system. An 80-column card, by itself, is not the answer. AtariWriter and almost all other word processors for the Atari were designed for a 40-column screen, so an 80-column card would make things worse, not better. However, an 80-column card combined with a compatible word processor might simplify your problem by making tabbing feasible, since you would be able to see exactly what will appear on paper without the tedious, scrolling preview mode of AtariWriter. One word processor that supports 80-columns that I have seen advertised recently is Atari Paper Clip from Batteries Included. It works with their Atari B.I. 80-column display adapter for XL systems. (Contact: Batteries Included, 17875 Sky Park North, Suite P, Irvine, CA 92714, 416 596-1405).

Another alternative is HomeWord from Sierra On-Line. At $69.95/disk it might be just what you are looking for. In the lower, right-hand corner of the screen, HomeWord gives you a smaller screen that shows you how the finished page will look. Each character is represented by a small graphics pixel. A flashing cursor on this mini-screen lets you see your position on the page as you type your document. Thus, it would let you see the exact position to which you are tabbing. Additionally, it gives you a preview of the printed page, as AtariWriter does, but has the advantage of giving you an 80-column display. No adapter is needed since it uses the Atari's high resolution graphics to form the

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Applying The Atari
Continued From Page 55

letters. (Contact: Sierra On-Line, Inc., P.O. Box 458, Coarsegold, CA 93614.)

I'd just love to have an Atari 800XL computer. But I hesitate getting one because on every one I've seen being demonstrated, the letters on the screen are "fuzzy". They seem to look fuzzy even on a monitor. I thought maybe my eyes were going away so I had a friend check it out and he noticed that when letters are typed on the screen they are not sharp. He even went to another store -- same story! Any idea what's going on? All the 800XLs I looked at did not have any software running. Maybe the picture is sharper with software running. I don't want to have to purchase a Commodore if possible.

M.L. McCrery
Lewiston, ID

Your problem is a most unusual one in that the Atari has always been noted for its excellent display. You should be able to tune the television to get a sharp, clear image. Or, perhaps it is the blue background. If that is the case, try typing:

POKE 710,0

and press return. This will turn the background black. You can POKE 710 with other values for other background colors. Aside from changing the screen color or the brightness of the text, running software will make no difference on the letters.

Personally, I own both Atari and Commodore systems and have always been more satisfied with my Atari's display.

If you are interested in the 800XL, I suggest at this time that you look into the newer 65XE or 130XE which should be available this month.

Programming Tips

This section contains programming hints and suggestions sent in by readers. If your tip is printed, you'll receive a three-dimensional holograph sticker.

From M. Rose (Cambridge, MA):

If you need a fast, reliable renumbering program for Atari BASIC programs, and if you own Microsoft BASIC, you can use Microsoft to renumber Atari BASIC! First, LIST your Atari BASIC program on cassette or diskette. Boot up with Microsoft and LOAD the program. Execute the RENUM command and SAVE the renumbered program back to cassette or diskette. Then, ENTER the program back in with the Atari BASIC. Microsoft will renumber all Atari BASIC statements with line numbers except for TRAP.

From Marvin Oppenheim (Monsey, NY):

In order to make it easier for me to type in program listings (especially long ones) I do the following: (1) I first dictate the entire listing into a tape recorder. (2) I then play it back while listening to it through a pair of headphones. (3) Since I am not a speed typist, I control the playback with the use of a foot pedal activator (available at any Radio Shack).

This sure makes typing in listings a lot easier.

Users Groups

I received an issue of the Pokey Press, "the official newsletter" of the Atari Computer Club of the Palm Beaches (Contact: Jim Woodward, 15993 S.W. 8th Ave. B-101, Delray Beach, FL 33444, Editor: Marvin Cox). It's interesting to see what's happening in Atari users groups around the country. Many of these newsletters have been useful and important information to share with the rest of the Atari world. I'd like to receive newsletters from other Atari users groups. Send them in. I'll try to mention as many as I can in the column. Hopefully, this column can serve as a national communications link among the many Atari users groups across the country.

Alarm Clock Operation

Let's take a brief look at how last month's Alarm Clock program works. The BASIC program you entered for the Alarm Clock contains a machine language program which is placed on Page 6 of memory. Page 6 is the area which does not interfere with your BASIC program memory.

The machine language program is then set up as part of the Atari's **vertical blank routine.** Every 1/60th of a second, the Atari jumps to a program in its operating system which updates the color registers, increments or decrements internal counters, and performs a variety of other tasks. This program is called the vertical blank routine. The clock program is added as an extension of this routine, and thus it runs 60 times per second.

The machine language clock routine keeps track of the number of times it has been executed. When it counts to 60, the program updates a counter containing the number of seconds which have elapsed. When the second-counter reaches 60, a minute counter is incremented, and, in turn, when the minute-counter reaches 60, the hour-counter is increased. Collectively displayed, these counters tell you the time.

In addition to incrementing counters, the routine checks if the current time is the same as the time set for the alarm. If they are equal, the alarm sounds and continues to beep until it detects that the START button has been depressed.

For those interested in assembly language, an assembly listing of this routine appears under the "Alarm Clock Assembly Code" heading.
Alarm Clock Assembly Code here.

Program Perfect

For the benefit of those new to **Computer Shopper**, and to those who had difficulty in entering this program due to its listing and revision over two issues, a complete, final, never-to-be-changed listing appears under **"Program Perfect."**

Next Month

We'll have a program to liven up your Graphics 0 display, plus we'll start entering a business applications program for those who keep mailing lists. As usual, we'll cover reader mail and learn more programming tips.

Reader's questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope for a personal reply.

A cassette or diskette of any program appearing in this column is available from the author for $5.00 per program, postpaid. Specify DOS 2 or DOS 3 when requesting a disk.

Address all correspondence to:

Jeff Brenner's
"Applying the Atari"
c/o Computer Shopper
P.O. Box F
Titusville, FL 32781 ●

ATARI 130ST
PERSONAL COMPUTER

ALARM CLOCK ASSEMBLY LISTING

```
10  *=$600
20  PLA
30  LDX #START/256
40  LDY #START&255
50  LDA #$07
60  JSR $E45C
70  LDA #$00
80  STA VAR3
90  RTS
0100 START SED
0110   LDX #0
0120 BACK LDA $CC,X
0130   CLC
0140   ADC #$01
0150   STA $CC,X
0160   CMP #$60
0170   BNE NONE
0180   LDA #$00
0190   STA $CC,X
0270 SKIP INX
0280   CPX #3
0290   BNE BACK
0300   LDA $CF
0310   CLC
0320   ADC #1
0330   STA $CF
0340   CMP #$13
0350   BNE NONE
0360   LDA #$01
0370   STA $CF
0380 NONE CPX #2
0381   BCC NONE2
0382   LDA $CF
0383   CMP VAR1
0384   BNE NONE2
0385   LDA $CE
0386   CMP VAR2
0387   BNE NONE2
0388   INC VAR3
0389 NONE2 CLD
0390   LDY #$12
0400   LDX #1
0410 LOOP LDA $CE,X
0420   LSR A
0430   LSR A
0440   LSR A
0450   LSR A
0460   ORA #144
0470   STA ($58),Y
0480   INY
0490   LDA $CE,X
0500   AND #$0F
0510   ORA #144
0520   STA ($58),Y
0530   INY
0540   INY
0550   DEX
0560   BPL LOOP
0570   DEY
0580   DEY
0581   DEY
0582   DEY
0590   LDA #154
0600   LDX $CC
0610   CPX #$30
0620   BCC COLON
0630   LDA #128
0640 COLON STA ($58),Y
0650   DEY
0660   DEY
0670   LDA ($58),Y
0680   CMP #144
0690   BNE NOTHING
0700   LDA #0
0710   STA ($58),Y
0720 NOTHING LDA VAR3
0730   BEQ JUMP
0740   LDA $CC
0750   CMP #$30
0760   BCC SOUND1
0770   LDA #$20
0780   STA $D200
0790   LDA #$C8
0800   STA $D201
0810   BNE JUMP
0820 SOUND1 LDA #$A0
0830   STA $D201
0840 JUMP LDA $D01F
0850   CMP #$06
0860   BNE NOPRESS
0870   LDA #0
0880   STA $D200
0890   STA $D201
0900   STA VAR3
0910 NOPRESS LDA $54
0920   BNE NOTOP
0930   LDA #$8F
0940   STA $2FC
0950 NOTOP JMP $E462
0960 VAR1 .BYTE 0
0970 VAR2 .BYTE 0
0980 VAR3 .BYTE 0
0990   .END
```

PROGRAM PERFECT

```
30000 CLR :CLOSE #1:CLOSE #2:N1=1:N2=N1+N1:N84=84:N85=N84+N1:N39=39:N65=65
30010 DIM LN$(120):OPEN #N1,9,N0,"E:":OPEN #N2,4,N0,"K:"
30020 PRINT CHR$(125):POSITION 12,N0:PRINT "PROGRAM ENTRY":POSITION 12,N1
30030 PRINT "By Jeff Brenner":IF ST THEN PRINT :PRINT "Current line: ";ST
30040 IF  NOT ST THEN PRINT :PRINT "Starting line: ";:INPUT #16;ST
30050 POSITION N39,5:? " ":POSITION N39,6:? " ":POSITION N39,7:? " "
30060 POSITION N2,5:PRINT "--- ";ST;:POKE N85,N2:PRINT "-";CHR$(30);:FOR I=N1 TO 3
30070 POKE 702,64:POKE 694,0:GET #N2,N:IF N=126 AND I>N1 THEN PRINT CHR$(30);"-";CHR$(30);:I=I-N
1:GOTO 30070
30080 IF N<N65 OR N>90 THEN GOSUB 30310:GOTO 30070
30090 PRINT CHR$(N);:NEXT I:SP=LEN(STR$(ST))
30100 FOR I=N1 TO SP+N2:? CHR$(31);:NEXT I:Y=PEEK(N84):X=PEEK(N85):ES=N0
30110 GET #N2,N:IF N=155 THEN POSITION N2,5:INPUT #N1;LN$:GOTO 30200
30120 IF N=156 OR N=157 THEN 30110
30130 IF ES THEN 30160
30140 IF (N=29 AND PEEK(N84)=Y+N2) OR (N=28 AND PEEK(N84)=Y) THEN 30110
30150 IF N=125 THEN 30020
30160 PRINT CHR$(N);:ES=N0:IF PEEK(N84)>Y+N2 THEN 30190
30170 IF PEEK(N84)=5 AND PEEK(N85)=SP+6 THEN 30060
30180 GOTO 30110
30190 GOSUB 30310:POKE N85,N39:POKE N84,Y+N2:PRINT CHR$(28);CHR$(29);:GOTO 30110
30200 POSITION N39,10:? " ":POSITION N39,11:? " ":POSITION N39,12:? " "
30210 T2=26*(ASC(LN$(N1,N1))-N65)+ASC(LN$(N2,N2))-N65:NL=ASC(LN$(3,3))-N65+N1
30220 POSITION N2,10:PRINT CHR$(156);LN$(5,LEN(LN$));:PRINT :PRINT :PRINT CHR$(157);"CONT"
30230 POSITION N2,8:POKE 842,13:STOP
30240 POKE 842,12:POSITION N2,10:PRINT CHR$(156);:POSITION N2,9:LIST ST
30250 T=NL:POSITION N2,10:INPUT #N1;LN$:FOR I=N1 TO LEN(LN$):T=T+ASC(LN$(I,I))
30260 IF T>650 THEN T=T-650
30270 NEXT I:IF T=T2 AND NL<26 THEN ST=ST+NL:GOTO 30020
30280 IF T=T2 AND NL=26 THEN 30320
30290 POSITION N2,9:FOR I=N1 TO 5:PRINT CHR$(156);:NEXT I
30300 PRINT :PRINT "ERROR - TRY AGAIN":GOSUB 30310:GOTO 30060
30310 SOUND N0,N85,12,8:IF N1^N1 THEN SOUND N0,N0,N0,N0:RETURN
30320 PRINT CHR$(125);"END OF PROGRAM - SAVE T2"
30330 FOR I=30000 TO 30320 STEP 10:POSITION 2,4:PRINT I:PRINT "CONT"
30340 POSITION 2,2:POKE 842,13:STOP
30350 NEXT I:PRINT CHR$(125):FOR I=30300 TO 30370 STEP 10:PRINT I:NEXT I
30360 LN$="PROGRAM ENTRY COMPLETED.":PRINT "POKE 842,12:PRINT CHR$(125);LN$"
30370 POSITION 2,0:POKE 842,13:STOP
```

CP/M

Public Domain Software

by Bill Chin

CP/M type software
Sig/M Users Group
Volumes 206 through 217
all are supplied in 8 in. diskette formats primarily... Check for other formats in your LOCAL areas.

CP/M type software
Sig/M Users Group
Volumes 206
Library, Printing and Sorting Routines
Updated Vfiler
Dump for a NEC APC

Sig/M Volume 208
Meta4 (8080)
Updated 3740 Utility
Z80 Bidirectional Show

Sig/M Volume 209
Selections from Thousand Oaks CA regional Bulletin Board

Sig/M Volume 212
CP/M Plus Utilities
Misc. Routines

Sig/M Volumes 213-214
Updated Regular Expression Compiler
(REC) by H. McIntosh
8086 Floating Point also 8080 w/o Floating Point Math

Sig/M Volume 215
Updated REC Documentation
Updated CNVRT and RUN which can execute files from SUBMIT files or LBR libraries

Sig/M Volume 216 and 217
Modem update MDM840 for CP/M-86, CP/M 80 Emulator and a dBASE II Programmers Toolkit

All disk orders and information requests should be sent to:
disks, $6, domestic
disks, $9, ($US) Foreign

printed quarterly catalog is
$2.50 - domestic
$4 ($US) Foreign

Sig/M Users Group
P.O. Box 97
Iselin, NJ
USA 08830-0097

IBM-PC type software

15 new releases from the NYACC IBM-PC PC-Blue Users Group. Their library now totals 101 and vastly expanding. There are also 4 additions to the Capital-PC Users Group up thru 33 as well as revisions to volumes

18 - RBBS-PC v 12.3B
and
22 - PC-Write v 2.4

Most of these programs will operate in a MS-DOS or PC-DOS environment but are supplied on a 320kb diskette format of v1.1x. check documentation. Most programs will also work on an AT or Jr model PC.

PC-Blue Users Group

has added 15 new volumes from 087 through 101

These volumes are available from:
cost is $7 domestic
$10 ($US) foreign.

PC-Blue Users Group
c/o NYACC
P.O. Box 106
Church St. Station
New York, NY
USA 10008-0106

pick up stats

Information/Questions

Any questions on these Public Domain Software libraries should be directed to the respective Users Groups named above but if there are and comments or questions please send them with a self addressed stamped envelope (if you desire a response) to:

Bill Chin
P.O. Box 2085
Clifton, NJ
USA 07015-2085

```
vol/no  filename      size   crc

PC-Blue 087
ListMate-"Mail Merge" for
MultiMate/Check Balancing System

ListMate is a "Mail Merge" like
utility for the MultiMate WP system
087.01  LISTMATE.LBR  221K 1F 8E

Checking Acct. Balancing System
087.02  PC-CHECK.LBR   65K B0 E3

contents of PC-Blue volume 87
087.03  -CATALOG.087     1K 4A 4C


PC-Blue Volume 088
Family Tree Utility
Letters n' Labels
Large BANNER Generator


Letters n' Labels
088.02  LNL      .LBR   80K BE 8F

Large BANNER Generator
088.03  BANNER   .LBR   40K 4F 79

contents of PC-Blue volume 088
088.04  -CATALOG.088     1K B6  C3

PC-Blue Volume 089
Disk Copy Utility
Small Spreadsheet
Global Pathing Utility
Toshiba Printer Driver-Volkswriter
Directory Commands processor

Disk Copy Utility
089.01  FREECOPY.LBR  115K 27 DC

Small Spreadsheet
089.02  MINICALC.LBR   64K B4 B8

Global Pathing Utility
089.03  GLOBALS .LBR   56K 2B 86

Toshiba Printer Driver
for Volkswriter WP
089.04  TOSHIBA .LBR   31K 63 23

Directory Commands system
089.05  TREEDIR  .LBR   11K 23  83

contents of PC-Blue volume 089
089.06  -CATALOG.089     2K  CA  09
```

```
PC-Blue Volumes 090-092
370 SuperTrek (requires 8087)

090.01  TREKFOR1.LBR  146K 21 6A
090.02  TREKFOR2.LBR  104K 43 EC
090.03  -CATALOG.090     2K 65 36
091.01  TREK370 .LBR   55K 7D CD
091.02  TREKASM .LBR    9K 1E 6F
091.03  TREKUTF .LBR   11K C2 38
091.04  TREKMSGS.LBR   45K C7 B9
091.05  TREKFOR3.LBR   85K 2F 86
091.06  TREKEXE .LBR   35K 32 3A
091.07  -CATALOG.091     4K 20 DF
092.01  DTREK   .EXE   245K F3 05
092.02  TREKDOC .LBR   67K E3 EA
092.03  -CATALOG.092     1K EB CC


PC-Blue Volume 093
IBM PC User Group Newsletter
November 1984 Exchange

093.01  PCUGPIC .LBR   59K 77 20
093.02  PCUGNL  .LBR   94K A0 E1
093.03  PCUGBAS .LBR   12K 40 BC
093.04  PCUGMISC.LBR   11K 3C FE
093.05  PCUGNEWS.LBR   79K B6
093.06  -CATALOG.093     3K 9F

PC-Blue Volume 094
dBase II Mail-List
Programmer's Calculator
Compact "XModem" Program
Typeout "sQueezed" Files

dBase2  Mail-List system
094.01  DBPRINT .LBR   75K CC 31

Programmer's Calculator
094.02  PROGCALC.LBR  129K C3 0F

System Clock Reminder
094.03  REMIND  .COM    2K 22 F7

PC-DOS 2 HELP Utility
094.04  HELP    .LBR   30K 10 01

Compact "XModem" Program
094.05  QMODEM  .COM   47K BD FB

Typeout "sQueezed" Files
094.06  TYPESQ   .EXE   15K B7  77

contents of PC-Blue volume 094
094.07  -CATALOG.094     1K  7D  B0


PC-Blue Volume 095
WP for "Kids"
File List Program
Checkbook-Ledger Utility

Word Processor for "Kids"
095.01  WPK      .LBR   72K 52 B1

File List Program
095.02  PC-LIST .LBR   21K 43 8A

Checkbook/Ledger Utility
095.03  MAGICHEK.LBR  187K 5C 68

contents of PC-Blue volume 095
095.04  -CATALOG.095     2K ED F3

PC-Blue Volumes 096-097
Updated FIDO Bulletin Board System
version 10.0

096.01  FIDOBBS .LBR    27K 5C 56
096.02  FIDOEXE .LBR    63K 7D 9D
096.03  FIDOHLP .LBR     9K 4C CD
096.04  FIDO    .PRN   175K 36 62
096.05  FIDOOTHR.LBR     6K 11 E9
096.06  -CATALOG.096     2K 9B 1A
097.01  FIDO_OTR.EXE   100K 3D 71
097.02  FIDO_IBM.EXE   101K 8D EA
097.03  FIDO_DEC.EXE   101K 0F D1
097.04  -CATALOG.097     1K 76 9B

PC-Blue Volumes 098-099
RBBS-PC  Bulletin  Board  System
version 12.2d from Capitol PC

098.01  RBBSMISC.LBR   113K 8A 9E
098.03  -CATALOG.098     1K 1C 5A
099.01  RBBSFILE.LBR    31K C7 38
099.05  -CATALOG.099     2K 06 7A

PC-Blue Volumes 100-101
U.S. Census Utility with summary by
County and City Databook

100.01  CNSUSDOC.LBR   176K 03 A2
100.02  CNSUSSYS.LBR   120K E7 BB
100.03  -CATALOG.100     1K 47 7F
101.01  CCDBTXT .LBR   118K 05 FD
101.02  CCDBDCT .LBR    30K 86 55
101.03  -CATALOG.101     1K D9 AE
```

Capital PC Users Group
has released 4 new volumes and revised 2 previous volumes.

All Capital PC Users Group diskettes are
$8 by domestic mail
$10 ($US) for foreign mail

Send orders to
Payments to Capital PC Users Group

CPCUG, Inc.
P.O.Box 6128
Silver Spring, MD
USA 20906-6128

and are always available at CPCUG main meeting presentations.

Membership information to:

Capital PC Users Group, Inc
P.O.Box 3189
Gaithersburg, MD
USA 20878-3189

Capital PC Users Group volume 030

CPCUG 030 is a result of a presentation to the CPC members various existing PC-DOS utilities which one might employ within one's customized system.

Examples...
FASTDISK....speedup for floppy
CLOCK or SHOWCLK ...time displays
IBMSHELL...the 'SHELL of PCDOS'
too many to describe...
its worth the bucks...

Directory of CPCUG 030

COVER1	COM	1536
COVER1	DOC	2560
MEMBRAIN	EXE	3072
CAT	DOC	15134
MEMBRAIN	DOC	3840
MORERAM	DOC	4231
MORERAM	COM	512
NDOSEDIT	COM	2560
NDOSEDIT	DOC	5632
REBEEP	DOC	1775
REBEEP	COM	128
TUNE	DOC	927
TUNE	COM	384
SDIR26	COM	3584
SDIR26	DOC	2065
FLIP	COM	384
FLIP	DOC	973
FDATE	COM	1536
FDATE	DOC	1536
FREE101	COM	384
FREE101	DOC	2560
GDEL	DOC	1024
PWD	COM	512
PWD	DOC	489
ALSEARCH	COM	9216
EQUIP102	COM	1792
EQUIP102	DOC	7808
PCUTIL	COM	4992
PCUTIL	DOC	1618
CATUTIL	COM	41344
LC	DOC	611
FASTDISK	COM	1024
FASTDISK	DOC	768
KBBUFF	DOC	1024
CWEEP1	DOC	8448
CAT	COM	4736
SP	DOC	9088
SP	EXE	2176
SPC	EXE	2304
SOUND	DOC	698
LIST4	COM	2560
ALTER	DOC	1163
CWEEP1	EXE	26368
PEACOCK	COM	640
ADDRIVE	COM	512
ADDRIVE	DOC	1536
LC	COM	1280
BACKSCRL	DOC	13824
BACKSCRL	COM	6400
IBMSHELL	COM	512
IBMSHELL	DOC	1123
DEMO2	FC	7936
DEMO3	FC	2560
MA	DOC	25882
MA	BAS	41896
MADOC	BAT	667
MACOPY	BAT	370
README		2413
PCWNDO	COM	21760
CPCUG	BAT	189

Capital PC Users Group Volume 033

Jim Button's got another useful program for IBM-PC and PC-Jr users

A spreadsheet system called PC-Calc as an addition to the PC-File which he's best known for.

Directory of CPCUG 033

PC-CALC	EXE	29056
PC-CALC2	EXE	30720
PC-OVL	EXE	21376
PC-CALC	MSG	25984
EXAMPLE		768
PC-CALC	DOC	124779
DOC	BAT	339
SOFTWARE	DOC	45690
CPCUG	BAT	463

Revisions to the Capital PC library

CPCUG 018 - RBBS-PC bulletin board system v12.3B revised for multi-user environment. It has support for networks as PC-NET and remote security system called WATCHDOG.

Directory of CPCUG 018a

MENU5		1536
MENU1		384
MENU2		640
MENU3		384
MENU4		390
MENU1G		640
MENU2G		640
MENU5G		1536
MENU3G		768
MENU4G		833
HELP07		1880
HELP01		1152
HELP03		640
HELP05		512
HELP08		512
HELP04		476
HELP06		8832
HELP02		1280
RBBS-PC	EXE	109824
CONFIG	EXE	105472
WELCOME		1074
NEWUSER		68
DIR		61
DIR99		73
BULLET		293
BULLET1		3058
FILESEC		1
PASSWRDS		1
RBBSINIT	BAT	2692
UTILITY	OBJ	768
BDRIVEC2	OBJ	1664
PC-NET	OBJ	256
WSDOS	EXE	28672

Directory of CPCUG 018b

UNWS	BAS	652
RBBS-PC	BAS	50556
WATCHDOG	COM	384
CAPITAL	PC	8562
SOFTWARE	LIB	47279
WATCHDOG	DOC	2432
WATCHDG1	COM	384
WATCHDOG	ASM	2304
WATCHDG1	ASM	2560
RBBS-PC	DOC	102002
USQ	EXE	13824
ADLF	BAS	682
FILECOMP	BAS	1408
CONFIG	BAS	57894
RBBS-DOC	BAT	1536
RBBSINIT	BAT	2816

CPCUG 022 - PC-WRITE revised by Bob Wallace to v2.4. New expanded printer support... even the laser printers.

Continued On Page 58

Public Domain Software
Continued From Page 57

Directory of CPCUG 022

GO	BAT	14
READ	ME	6681
QUICKS	ME	960
PRINTMAN	COM	1033
TYPEMAN	COM	1065
FILEMAN	COM	937
SETPRN	COM	256
SETPRN	DOC	2816
GDEL	EXE	13312
WHEREIS	DOC	896
PEACOCK	DOC	384
SCRN	DOC	1920
KOLOR	DOC	2176
SCREEN	DOC	1152
SPLIT	DOC	794
WAITN	DOC	768
VOLSER	DOC	604
VDL	DOC	1408
WAITN	COM	128
VOLSER	COM	1152
ALTER	COM	1024
SOUND	COM	256
SCRN	COM	512
SCROLLK	COM	256
CTRLPRTS	BAS	2816
CTRLPRTS	DOC	1549
GCOPY	DOC	2304
GCOPY	EXE	14848
KOLOR	COM	1024
SPLIT	COM	128
SCREEN	EXE	1536
KBBUFF	COM	696
SHOWCLK	COM	1024
SHOWDIR	COM	1280
SHOWDIR	DOC	672
VDL	COM	1024
WHEREIS	COM	768
CLEAR	COM	128
ALSEARCH	DOC	771
CLEAR	DOC	1020
L5	COM	2944
CLOCK	COM	1024
CLOCK	DOC	256
SHOWCLK	DOC	724
READ	ME	3545
CPCUG	BAT	297

Capital PC Users Group volume 031

Printing programs as banners, Type out BANREF.TXT or try holiday greetings... SANTA.BAS

Touch type on your PC using PC-TOUCH

or records for IRS needs on (041585) using ON/OFFTIME or TIMEKEEP...for those audits.

Directory of CPCUG 031

BANNER	BAS	30775
BAN	BAN	2753
WEWISH	BAN	531
TEST	BAN	2753
JOY	BAN	285
JINGLE	BAN	529
BANDOC	BAS	2432
BANKEYS	DAT	128
BANREF	TXT	2809
BANNER3	USR	2951
BANNER3	ASM	34623
21	EXE	38016
PC-TOUCH	EXE	33664
PC-TOUCH	DOC	4705
PC-TOUCH	FIL	3993
PC-TOUCH	BAS	12160
TIMEKEEP	EXE	26496
TIMEKEEP	DOC	7760
OFFTIME	EXE	23168
ONTIME	EXE	18432
SOFTWARE	DOC	42580
SANTA	TQT	11500
SANTA	BAS	128
UNSQ	COM	2176
CPCUG	BAT	1177
DISK31	DOC	1790
CAPITAL	PC	1225

Capital PC Users Group 032

Accounting type software such as FreeCalc FC v1.0...its a 100x25 spreadsheet system.

A check register accounting program by Don Ramsey called MA - Micro Accounting. Yes...its written in BASIC language.

A public domain windowing executive as a $49 item called PCWNDO.COM

FC	EXE	108928
FC	DOC	73472
FC	HLP	1280
HOWPRINT		768
DEMO1	FC	1536
MANUAL1	CRN	31609
MANUAL2	CRN	29486
MANUAL3	CRN	34981
MANUAL4	CRN	36766
SPECIAL	DOC	2042
REGFORM	DOC	1046
TUTORIAL	DOC	11968
ADDEND24	DOC	3278
ED	EXE	44608
PR	EXE	19680
MANYCOPY	BAT	35
HELPE	DEF	12084
RULER	DEF	83
COLOR	DEF	87
SHIFT	DEF	507
M_PCWRIT	COM	1433
PRINT	TST	1181
PRINTER	DOC	1753

Expanded printer support even the LASER printers

CENTR351	PRT	491
ANJAC830	PRT	468
TINST855	PRT	648
PROWRITE	PRT	565
DIABLO16	PRT	535
TALLY160	PRT	611
STARWRIT	PRT	541
PINWRITE	PRT	464
OKI84A92	PRT	474
IBMEPSON	PRT	952
TRANS315	PRT	757
OLDEPSON	PRT	989
DIABLO63	PRT	834
TTXC1014	PRT	329
OKI8283A	PRT	205
IBMCOLOR	PRT	887
OKIP2350	PRT	411
OKIP2410	PRT	422
IDSPR132	PRT	948
IDSPR460	PRT	456
OKIBMSON	PRT	505
TOSH1350	PRT	662
SPIN3550	PRT	503
SPIN5530	PRT	486
SPIN3510	PRT	477
STAR1015	PRT	508
ANJAC832	PRT	539
HPLASERJ	PRT	888
DAIS2000	PRT	343
DAISTRS2	PRT	381
OKIWRITE	PRT	486
EPLQ1500	PRT	581
FOREPSON	PRT	754
HPTHINKJ	PRT	477
DATAS180	PRT	282
OLY2CRX1	PRT	303
SMITD100	PRT	535
SREED550	PRT	531
QUMESP20	PRT	546
BROTHER1	PRT	284
PRTEK912	PRT	559
CENTR739	PRT	263
IBMW5216	PRT	579
PKXP1091	PRT	562
DATAS220	PRT	407
SIMPLE	PRT	385

dBASE II PROGRAMMERS

• AARDVARK • AB DICK MAGNA III • ACCESS • AFFINITEC ANALYZER • ALPHATRONIC PC • ALSPA ★ • ALTOS ★ • AOS • APPLE CP/M • ARC BATCHER MICRO • ARCHIVES • ASSOCIATE ★ • ATR 8000 • AVITAR • BASIC 4 • BMC IF800 • CCS ★ • COLUMBIA 964 • COMPUGRAPHIC MCS 8204 • COMPUPRO ★ • CP/M DS/DD • CP/M SS/DD (IBM 3740) • CROMEMCO ★ • DATAVUE DV80 • DEC RAINBOW • DEC ROBIN (VT-100) • DELTA SYSTEMS ★ • DICTAPHONE • DIGILOG ★ • DIRECT • DISCOVERY 500 • EAGLE ★ • EPIC • EPSON QX-10 • GENIE • GNAT ★ • HEATH ★ • HEWLETT-PACKARD ★ • IBM DISPLAYWRITER ★ • IBM MS-DOS ★ • IBM PC CP/M-86 ★ • ICL PC 2 • ISI • IMS • IMS INTERNATIONAL ★ • IMSAI • INTERSIL MPI M92 • MTI • NCR ★ • NEC ★ • NOMIS • NORTHERN TELECOM 503 • NOVELL • OHIO SCIENTIFIC • ITHACA • ITT 3030 ★ • KAYPRO ★ • LANIER • LOBO MAX-80 ★ • LOMAS THUNDER 186 ★ • MAGIC COMPUTER • MASTERMAX ★ • MEASUREMENT SYSTEMS ★ • MEMOTECH MTX512 • MICRO SOURCE M6000P • MOLECULAR ★ • MONROE ★ • MORROW ★ • OLIVETTI ETV 300 • OLIVETTI M20 • OLYMPIA • OSBORNE ★ • OSM • OTRONA • PBM • PHILLIPS 3000 • PICKLES AND TROUT • PIED PIPER • PMC-101 • • QUASAR MICRO SYSTEM • R-MICRO • RAIR BLACK BOX • SANYO • SD SYSTEMS ★ • SDS 2000 • SEIKO 8600 • SHARP ★ • SKS 2000 • • SORCC • SUPERBRAIN ★ • SYSTEL IV • TELECON • TELETEK ★ • TELEVIDEO ★ • TI PROFESSIONAL ★ • TOPPER • TOSHIBA T-100 PC • TRS-80 ★ • HUNGERMANN-BASS NET ONE • VECTOR GRAPHIC ★ • VISUAL 1050 • VOYAGER • WANGWRITER • XEROX ★ • ZENITH • ZORBA • •

HILCO-CHECK

CHECK provides easy maintenance and debugging of dBASE II command files by identifying improper nesting of conditional commands and correctly indenting for each nest. CHECK also improves execution speed by removing unnecessary code and white space from command files. As an added feature, CHECK strips bit seven and WordStar hyphens from files corrupted by word processors. Cost is $49.00.

REPAIR

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TEXAS INSTRUMENTS

Randy's Ravings

by Randy Holcomb

This month we will look at the MBP Clock/ADC card kit for the 99/4A and other news from and about the TI community.

MBP Clock/ADC Card
MBP Inc.
5522 E. Harry
Wichita, KS 67218

If you wanted your system to have a clock on it you really had only one choice-the Hayes Chronograph, which takes up one of your RS232 ports. Now from MBP comes not only a real/time clock but an 8-channel analog-to-digital converter (ADC) as well. The kit comes as a bare PC board with documentation and a diskette containing two programs for using the clock and ADC functions respectively. The price of the PC board is $39.95.

Building the kit. Be forewarned - this is NOT a kit for BEGINNERS! There are numerous jumpers to wire up and the board is not solder-masked or silk-screened; making kit assembly viable only for the experienced kit builder. (It took me just over 2 hours alone to wire all the necessary jumpers.) Although the PC board leaves a lot to be desired in terms of its layout it does get the job done. Once the jumpers were in place putting the components on the board was straightforward and was done without any problems. The instruction manual that comes with the card kit has a check-off spot after each part is installed; it is advisable that the instructions be followed to the letter. Later on as I was debugging a problem that I had with my board I chatted with Jerry McClusky, the operator of the Wichita TIBBS (316-681-3167) and was told that the "optional" parts that were mentioned in the text really aren't optional-especially the trimmer capacitor. It seems that there is some parasitic capacitance on the clock circuit that feeds the clock chip and without the capacitor the clock will run but its timing accuracy will be way off - so get the optional capacitors and install them. The only real problem I had with the kit was a bad 74LS138 decoder chip which provided the addressability to the card. Once a new chip was installed the card came up with no further incidents and has been keeping accurate time. MBP provides 2 demo programs (CLOCK and ADC_TEST) which will test the card out. For the ADC test it isn't necessary to build the resistor ladder network. Just get a length of ribbon cable with 16-pin DIP headers and plug one end into the card and hold the edge of the pins marked by pin 1 on your forefinger. Load the ADC_TEST program, and touch pin 16 on the header and observe the readings. Now remove your thumb, and place your thumb on pin 9 and observe the readings. When you touch pin 16 the readings should go close to or at zero; when you touch pin 9 the readings should go to or hit 255. This indicates that the ADC is working properly.

Care and Feeding of the card. The main purpose of the MBP Clock/ADC card is to provide 99/4A users with a real/time clock and an 8-channel 0-5vdc analog-to-digital converter. All that is really required of the card owner is to adjust the clock to be reasonably accurate (which is done by the trimmer capacitor) and not exceeding the input requirements on the ADC port. The alkaline AA cells that keep the clock alive when power is removed should last about a year; you may want to consider installing a battery mount for the AA cells or use one of the new lithium 3-volt cells and a matching battery holder to make it more convenient. Right now the TIBBS bulletin board software is the only known piece of software that supports the MBP card. However, don't let the dearth of software scare you off from getting the kit, the demo programs alone can serve as a base for many different applications of the card. Should you have any problems with the card, leave a message on the Wichita TIBBS and you should get an answer to your problem; MBP will also repair the card for $10 plus parts if you get desperate.

For you assembler programmers, on page 175 are the equates to use when accessing the MBP Clock/ADC card in your program. Note that the clock chip returns its values as BCD instead of binary.

All in all, a good first showing for a new hardware producer for the 99/4A.

More CorComp Woes. Last month I mentioned how my CorComp DSDD controller died and that I was sending it back. Well, it came back and it STILL did not function properly. For a while I thought I was the only one having problems until I received this message on the TI Forum:

From: Jim Lewis

In response to Randy's CorComp problems, DON'T FEEL LONELY, RANDY!!! I'm currently on my 4th (yes, 4th) CorComp Card. The story goes like this:

1. Heard about the card from this forum, and having "gadget-mania", ordered one from my local dealer.
2. Got the thing powered up and it worked GREAT.
3. Christmas was coming, and the wife said 128K Foundation Card was OK to order. Found out that original card wasn't compatible with it so called Don Scofield and asked for upgrade. He sent new ver-

Continued on page 60

```
    This is a 13 screen TI FORTH pgm
    that will convert a DV/80 file into
    a series of FORTH screens, or a
    number of FORTH screens into a
    DV/80 file. The program originaly
    appeared in the Aug issue of
    SUBFILE99, as a SINGLE screen
    transfer.  It has been modified to
    require a FROM & TO screen # &
    process btw those limits.

SCREEN # 112
 0
 1 ( SET UP FILE WORDS AND POINT TO HELP SCREENS       ) ( Page 1)
 2
 3   DECIMAL
 4
 5   68 CLOAD FILE              ( CALL UP -FILE SCREENS)
 6
 7 : HELPTRAN     118 LOAD   ;  (                      )
 8 : HELPSCR      120 LOAD   ;  ( POINT TO HELP SCREENS)
 9 : HELPDSK      122 LOAD   ;  (                      )
10
11 : BEEP          52 GPLLNK ;  ( GPL POKE FOR TONE    )    -->
12
13
14
15

SCREEN # 113
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES MCA 19JUL84 )
 1
 2   HEX                                                  ~
 3                                                        ( Page 2)
 4 ( SET UP PERIPHERAL ACCESS BLOCK )
 5
 6 0 VARIABLE    FILBUF  50 ALLOT ( CREATE AN 80 [>50] CHR BUFFER)
 7               PABS  @  A +     ( DATA IS 10 [>A]BYTES INTO PAB)
 8               FILBUF     1900  ( PLACE THE BUFFER AT VDP >1900)
 9               FILE     FILTRAN ( REFER TO THIS PAB AS FILTRAN )
10
11 ( SET DISK FILE PARAMETERS       )
12
13 : SETFILE     FILTRAN  SET-PAB   ( CALL UP PAB AREA      )
14               SQNTL DSPLY        ( SEQUENTIAL, DISPLAY, )
15               VRBL  50 REC-LEN ; ( VARIABLE 80 [>50]    ) -->

SCREEN # 114
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES     16AUG84 )
 1 ( DEFINE FILE OUTPUT ROUTINE )                        ( Page 3)
 2 DECIMAL
 3
 4 : PUTFILE  CR ." INSERT DATA FILE DISK." CR KEY DROP
 5            APPND FILTRAN OPN          ( OPEN THE PAB FOR OUTPUT)
 6 1+ SWAP DO I DUP CR ." COPYING SCREEN #" . CR
 7
 8 BLOCK 16 0 DO DUP FILBUF 80 BLANKS  (  LOOP FOR 16 RECORDS    )
 9                  FILBUF   64 CMOVE  (  COPY 64 CHAR FROM BUFR)
10                           64 WRT    (  WRITE REC# I [64 CHRS])
11                           64 +      (  INC BUFFR ADDR [1 LN] )
12            LOOP DROP      LOOP      (  BACK FOR NEXT RECORD  )
13          CLSE                       (  CLOSE THE FILE        )
14
15      BEEP  ." DISK FILE COMPLETED. "   CR CR CR QUIT ;     -->
```

```
SCREEN # 115
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES     16AUG84 )
 1
 2 ( DEFINE FILE INPUT ROUTINE )                         ( Page 4)
 3
 4 : GETFILE    CR ." INSERT DATA FILE DISK." CR KEY DROP
 5              INPT FILTRAN OPN          ( OPEN THE PAB FOR INPUT)
 6       1+ SWAP DO I DUP CR ." LOADING SCREEN " . CR
 7               DUP BLOCK                ( GET SCREEN ADDRESS    )
 8               16 0 DO FILBUF 80 BLANKS ( LOOP FOR 16 RECORDS   )
 9               RD DROP                  ( READ REC FROM DISK    )
10             DUP FILBUF SWAP 64 CMOVE   ( MOVE LINE INTO BUFFER )
11               64 +                     ( INC BUFFER CHAR COUNT )
12               LOOP DROP                ( BACK FOR NEXT RECORD  )
13         BLOCK DROP UPDATE LOOP         ( UPDATE THE DICTIONARY )
14               CLSE                     ( CLOSE THE FILE        )
15       BEEP ." ALL SCREENS LOADED." CR CR CR QUIT ;     -->

SCREEN # 116
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES     16AUG84 )
 1
 2 ( FORTH SCREEN TO DIS/VAR 80 FILE ROUTINE)            ( Page 5)
 3
 4 : SCR-DSK ( scr#[s] scr#[e] --- )
 5
 6         CLS 9 3 GOTOXY ." SCREEN TO DISK TRANSFER"
 7             9 4 GOTOXY ." ======================="
 8             CR CR CR CR CR
 9             SETFILE
10             BEEP
11           ." ENTER FILE DESCRIPTOR WORD"
12             CR CR
13           ." THEN TYPE 'PUTFILE'."
14             CR
15             QUIT ;                                    -->

SCREEN # 117
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES     16AUG84 )
 1
 2 ( DIS/VAR 80 FILE TO FORTH SCREEN ROUTINE)            ( Page 6)
 3
 4 : DSK-SCR ( scr#[s] scr#[e] --- )                          $
 5
 6         CLS 9 3 GOTOXY ." SCREEN TO DISK TRANSFER"
 7             9 4 GOTOXY ." ======================="
 8             CR CR CR CR CR
 9             SETFILE
10             BEEP
11           ." ENTER FILE DESCRIPTOR WORD"
12             CR CR
13           ." THEN TYPE 'GETFILE'"
14             CR
15             QUIT ;

SCREEN # 118
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES     16AUG84 )
 1     CLS 6 1 GOTOXY ." FORTH FILE TRANSFER SCREENS "   ( Page 7)
 2         6 2 GOTOXY ." ============================ " CR CR CR CR
 3       ."     THE -FTRAN SCREENS ADD SEVERAL NEW"     CR
 4       ."  WORDS TO YOUR DICTIONARY.  THEY ARE: "     CR CR
 5       ."      SCR-DSK    ( scr#[s] scr#[e] --- )"    CR
 6       ."      DSK-SCR    ( scr#[s] scr#[e] --- )"    CR
 7       ."      HELPTRAN       ( this screen )    "    CR
 8       ."      HELPSCR    ( aid for scr-dsk )    "    CR
 9       ."      HELPDSK    ( aid for dsk-scr )    "    CR
10       ."      GETFILE  ( reads a disk file )    "    CR
11       ."      PUTFILE  ( writes a disk file )   "    CR CR
12       ."    THESE WORDS ALLOW YOUR FORTH DISK   "    CR
13       ."  TO READ SCREENS WRITTEN BY TI-WRITER "    CR
14       ."  OR DOWNLOADED WITH TE II VIA CTRL-2. "    CR CR
15 BEEP  ."                          HIT ANY KEY   "    KEY DROP -->
```

Randy's Ravings
Continued from page 59

sion (2.2) via FedEx with inst. to return my old one as soon as new one arrived (I bought the FedEx bill!!)

4. Got new card and promptly returned old one-plugged it in and...yuk!!! Read/Write errors all over the place. New disk manager prog. wouldn't load/run assembly files right, disk in it ALWAYS found several sectors bad after formatting, etc. etc. etc.!!!

5. Called up Don. They said a new one would be right out! 2½ wks. later, called again asking where it was. NEVER SENT!! Scofield no longer employed there. Thought I'd bought the farm. Secretary said would send card UPS Air. Got it over a WEEK later and had SAME PROBLEMS.

6. Called again a bit irate. They said "will send another" which they did. Got it about 1½ wks. later. Plugged in and worked fine except had to use orig. disk manager prog. The

Continued on page 175

```
SCREEN # 119
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES MCA 19JUL84 )
 1 CLS 25 0 GOTOXY  ." HELPTRAN, cont." CR CR CR          ( Page 8)
 2       ."      IN ORDER TO COMPLETE A TRANSFER  " CR
 3       ." BETWEEN DISK AND SCREEN YOU MUST      " CR
 4       ." INVOKE ONE OTHER FORTH WORD - THE     " CR
 5       ." TI-DOS FILE DESCRIPTOR.  THE FILE     " CR
 6       ." DESCRIPTOR PLACES THE DISK FILE NAME" CR
 7       ." INTO THE PAB AREA.  FOR INSTANCE, TO" CR
 8       ." ACCESS THE FILE 'F-SCR1' ON DISK #2 " CR
 9       ." YOU WOULD TYPE THE FOLLOWING:       " CR CR
10       ."      F-D' DSK2.F-SCR1'              " CR CR
11       ." NOTE: the single-quotes should be   " CR
12       ." replaced with double-quotes.        " CR CR
13       ."    FOR MORE ON THE FILE DESCRIPTOR  " CR
14       ." SEE CHAP. 8 OF THE TI FORTH MANUAL. " CR CR
15 BEEP 24 22 GOTOXY ." HIT ANY KEY   " KEY DROP  CLS 0 0 GOTOXY

SCREEN # 120
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES      16AUG84 )
 1                                                        ( Page 9)
 2       CLS      16 0 GOTOXY ." HELPSCR "
 3                16 1 GOTOXY ." ------- "                    CR CR
 4       ."      THE WORD 'SCR-DSK' WILL CHANGE A  "  CR CR
 5       ." FORTH SCREEN INTO A DIS/VAR 80 FILE.   "  CR CR
 6       ." THE D/V 80 FILE CAN THEN BEEN READ BY  "  CR CR
 7       ." TI-WRITER, UPLOADED USING TE II, ETC.  "  CR CR
 8       ." 'SCR-DSK' EXPECTS A FROM & TO SCREEN #  "  CR CR
 9       ." ON THE STACK.  YOU WILL THEN BE ASKED  "  CR CR
10       ." FOR THE PROPER FILE DESCRIPTOR. THEN   "  CR CR
11       ." INSTRUCTED TO TYPE 'PUTFILE' ( DON'T   "  CR CR
12       ." TYPE THE [']S ).  FOR MORE ABOUT THE   "  CR CR
13 BEEP  ." FILE DESCRIPTOR TYPE 'HELPTRAN'        "  CR CR
14       ."                          HIT A KEY    "  KEY DROP
15 CLS 0 0 GOTOXY                                        -->

SCREEN # 121
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES      16AUG84 )
 1 CLS 25 0 GOTOXY ." HELPSCR, cont." CR CR CR            ( Page 10)
 2 ." THIS VERSION OF -FTRAN WILL TRANSFER    " CR
 3 ." MULTIPLE SCREENS AT A TIME TO THE FILE  " CR
 4 ." INDICATED.                              " CR
 5 ."   IF YOU WANT TO COPY *ONLY* ONE [1]    " CR
 6 ." SCREEN, YOU MUST KEY THE SCREEN NUMBER  " CR
 7 ." *TWICE* [ie: 105 105 SCR-DSK].          " CR
 8 BEEP ." <END OF HELPSCR>          HIT A KEY    "  KEY DROP
 9
10
11 CLS 0 0 GOTOXY
12
13
14
15

SCREEN # 122
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES      16AUG84 )
 1      CLS      16 0 GOTOXY ." HELPDSK "                 ( Page 11)
 2               16 1 GOTOXY ." ------- "              CR CR
 3       ."    THE WORD 'DSK-SCR' WILL CHANGE A     "  CR CR
 4       ." DIS/VAR 80 FILE INTO A FORTH SCREEN.    "  CR CR
 5       ." THIS MEANS FILES CREATED WITH TI-WRITER"  CR CR
 6       ." OR DOWNLOADED WITH TE II CAN BE READ BY"  CR CR
 7       ." THE FORTH SYSTEM. "                       CR CR
 8       ."    'DSK-SCR'  EXPECTS A SCREEN NUMBER   "  CR CR
 9       ." (DESTINATION) ON THE STACK.  YOU WILL   "  CR CR
10       ." BE PROMPTED TO ENTER THE PROPER FILE    "  CR CR
11       ." DESCRIPTOR NAME AND THEN TO TYPE        "  CR CR
12       ." 'GETFILE' (DON'T TYPE THE [']) SYMBOLS) "  CR CR
13 BEEP ."                          HIT A KEY    "  KEY DROP
14                                                       -->
15

SCREEN # 123
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES      16AUG84 )
 1                                                        ( Page 12 )
 2
 3 CLS 25 0 GOTOXY ." HELPDSK, cont."                 CR CR CR
 4 ."    FOR MORE ON THE FILE DESCRIPTOR       " CR
 5 ." TYPE 'HELPTRAN'.                         " CR
 6 ."   THIS VERSION OF -FILTRN WILL COPY      " CR
 7 ." YOUR FILE TO MULTIPLE CONSECUTIVE        " CR
 8 ." SCREENS.  IF YOU HAVE ONLY ONE [1]       " CR
 9 ." SCREEN TO COPY, YOU MUST SPECIFY IT      " CR
10 ." *TWICE*.  FOR EXAMPLE:  TO COPY A FILE   " CR
11 ." TO SCREEN # 150, KEY 150 150 DSK-SCR.    " CR
12 ." TO COPY A FILE TO SCREENS 150 - 160,     " CR
13 ." KEY 150 160 DSK-SCR.                     "
14 ."                          HIT A KEY      " KEY DROP
15 CLS 0 0 GOTOXY                                        -->

SCREEN # 124
 0 ( -FTRAN2 - FORTH TO DIS/VAR 80 TRANSFER ROUTINES      16AUG84 )
 1                                                        ( Page 13 )
 2 CLS 25 0 GOTOXY ." HELPDSK, cont." CR CR CR
 3 ."      ********** WARNING *********       " CR
 4 ." WHEN USING THE 'DSK-SCR WORD, YOU *MUST*" CR
 5 ." MAKE SURE THAT EACH SCREEN BEING COPIED " CR
 6 ." HAS *EXACTLY* 16 RECORDS OR A FILE I/O  " CR
 7 ." ERROR WILL OCCUR.                       " CR
 8
 9 BEEP ."  <END OF HELPDSK>          HIT A KEY      " KEY DROP
10
11
12
13
14
15
```

How To Make A Videx Videoterm Card Disappear

by Philip Chien

The Videx Videoterm card is one of the more versatile accessories available for the Apple II. But with it installed in a system some programs won't work. Specifically, there is a "Bug" in Run-time Pascal 1.1. Many programs such as Apple Stellar Invaders, PFS, Dow Jones & News Reporter, etc. will initialize the Videoterm card while booting (as all Pascal programs do); then turn off all external devices, including the Videoterm card WITHOUT SHUTTING OFF THE SOFT-SWITCH, leaving the user with a blank 80 column mode screen, while the text is printed on the invisible 40 column mode screen. A-R-R-G-G-G-H-H-!-!-!-!-!

The new release of Pascal (version 1.2) acknowledges the problem, and corrects the bug. All a software developer has to do is set the flag RTSETMODE, and external devices (such as the Videoterm card) won't be initialized, unless the program author wants them to be initialized. Unfortunately, there are scores of application programs which were licensed for Pascal 1.1, and only a few of them will be eventually upgraded to Pascal version 1.2.

The external terminal bug is very annoying, and easy enough for the software manufacturer to fix, even in Pascal 1.1 (Wizadry is one such product). All that has to be done is either from machine language (LDA $C058) or from Pascal itself:

```
USES APPLESTUFF;

TTLOUT (0,FALSE);
```

But if the manufacturer isn't willing (e.g. Type Faces by Alpha Software), or able to put in the fix (e.g. if the author no longer works for the software company, and the company doesn't have access to the source code) the only way an end user could use the program was to shut off the Apple, disassemble it; and remove the Videoterm in order to run the program. Until now.

To make it disappear:

Place the Videoterm card in a black box; Chant "Woz is Great; Woz is good". . . and if you're David Copperfield the Videoterm will disappear. For the rest of us, a more mundane method must be used.

The following modification requires the use of a soldering iron and will probably void several different warranties. Neither the author or the publisher of this magazine takes any responsibility for baked apples.

Parts required:
30cm (6") 24 gauge SOLID wire; 30cm (6") wire wrap wire; 1 SPST switch (one you can easily mount on your Apple's case); solder, soldering iron, wire wrap tool, IC puller, etc.

Examine the Videoterm card. There will be an EPROM marked VT-FRM-600, V2.4 or something similar in location U3. (See the back of the Videoterm manual for a picture of the card with the IC locations marked if you can't find the EPROM.) If this EPROM is removed, then Pascal won't find the Videoterm in the system, won't turn on the soft switch and solves the entire problem. Unfortunately, only .01% of the programs made for the Videoterm card would work without the EPROM installed. (That .01% addresses the CTRC chip

Continued on page 172

Upgrading The TI 99/4A

by Randy Holcomb

Since we last presented our initial outlay on the TMS 9995 in this series many people have been chatting about TIs latest VDP chip entry known as the TMS 9228 Advanced Video Display Processor. Several other magazines and trade journals have discussed the architecture of this chip so there's no need to delve over that material; however recent rumors have surfaced that have indicated that one of the 99/8 clones being prepped will be using this chip. Well, we did a quick check with the TI Regional Technology Center in our area (Chicago) and was told by their rep that they could not deny the part number but no documentation or samples of the chip exist. So until you see one of these 99/8 clones and open up their innards be wary of what the claims are.

Response to the first part has been quite surprising and phenominal. At this time we want to give you an update as to where we are with the project and explain why we chose the design we have decided upon.

The Console is gone. We have opted instead of a separate console with keyboard and flex cable to place the computer in the expansion box as 2 separate cards: one card which contains the microprocessor and memory, and the second card containing the VDP, System ROM's and the console ports, plus the keyboard wiring. A separate 95-key keyboard is being employed in this implementation; the connector will remain electrically the same as the TI keyboard for ease of convenience. The cartridge port presently on the console will be brought out as a separate assembly with room to hold 5 cartridge slots selected by hardware (we are examining the operating system to see if software selection is possible; somewhere in the GROM code is a message called "REVIEW MODULE LIBRARY" which we'd like to exploit if present.)

The reason for 2 cards becomes apparent in that when the 9228 becomes available all that will be needed is a new video board; conversely if a new CPU card becomes available all that you need to do is to drop in the new CPU card and remove the old one; keeping your I/O card in place. This will allow for maximum flexibility in the system and not take up any more room than currently used in a standard /4A system (2 cards are used for 32K memory and the flex cable interface as it stands.)

This setup means that several peripherals that would normally be found on a system will be unusable in this new configuration; most notably the Speech Synthesizer and the joysticks/cassette port. Our rationale behind this is that most TI owners have more than 1 console floating around where the speech can be used and the fact that the joysticks are primarily used by games; also

Continued on page 172

TIMEX-SINCLAIR

Timex-Sinclair Survival Column

by Mark L. Fendrick

It has been a while since we looked at games for the Timex/Sinclair computers. Since games are almost a universal pastime among computer owners, this month we will look at a few games available for your computer.

Arcade games are the oldest form of games available for the micro-computer. The T/S 1000/1500 leaves a lot to be desired displaying games because the display is low resolution, and the graphics are a bit primitive. However, that has not stopped the development of many ingenious games which make the most of the abilities of Timex/Sinclair computers. Games written in machine code are actually quite fast and compensate somewhat for the display of the T/S 1000/1500. Unfortunately for T/S 1000/1500 (and ZX-81) owners, no new software seems to be developing for these computers in this country. This, of course, can be traced to Timex's abandonment. However, in the United Kingdom and other countries, the ZX-81 is still very popular, and development continues. I recently received two tapes from Cascade Games, Ltd. (Suite 4; 1-3 Haywra Crescent; Harrogate; N. Yorkshire, HG15BG; England; Telex: 57453), both named Cassette 50. One is the ZX-81 version, and the other is the ZX Spectrum version. Most of the games are written for the unexpanded ZX-81 (1K) and will work on the unexpanded T/S 1000 (2K). Eleven of the 50 games on this tape are marked (16K) and will require at least a 16K expansion on a ZX-81 or T/S 1000. They will all, of course, work on an unexpanded T/S 1500 containing 16K of onboard memory. The ZX Spectrum mostly contains programs that are written in BASIC, and will LOAD and RUN on a standard T/S 2068, which is almost identical to a 48K ZX Spectrum. Actually, most games will run in just 16K (making them compatible with 16K ZX Spectrums) but that shouldn't affect any U.S. user. There are a few programs, however, which contain some machine code routines which won't run on the standard T/S 2068, but does work on a T/S 2068 equipped with a Spectrum Emulator, ROMSWITCH, or Spectrum ROM. Both tapes are excellent, and will keep you busy for hours on end. The games on both versions are quite well-done, and contain adaptations of some very well known arcade games. Versions are also available for VIC-20, Commodore 64, Atari, Apple and other home computers.

Another British company still developing quality software for the ZX-81 is Software Farm (155 Whiteladies Road; Clifton; Bristol, BS8 2RF; England; Telex: 444742 AF-MADV G). They have games for the ZX-81 which produce high resolution graphics on a 16K machine. The amazing thing about these programs is that they do not require any additional hardware! The Software Farm has two titles utilizing this feature: Forty Niner (which has become a British classic), and Rocket Man. I must admit, however, that I have not yet been able to LOAD either of these into my ZX-81, but since I modified it to display white letters on a black background, that is not an uncommon problem. I will try again on another computer and let you know the results I get. In the meantime, you may want to write to the U.K. for details and Software Farm's catalog of software for the ZX-81 and Spectrum.

Of course, T/S 2068 owners can buy arcade games which will run directly on their computer. Many games from Quicksilva (426 West Nakoma; San Antonio, TX 78216; (512) 340-3684), have been translated from their original ZX Spectrum versions. One such program is Bugaboo. The story is simple, your pet flea, Bugaboo, has fallen down a pit, and you have to help him hop (fleas do hop, don't they?) from overhang to overhang to the top of the pit and out. Easy? Guess again! Many of the plants and overhangs are situated so that only an exact combination of timing, strength and angle can overcome the obstacle. Oh, I forgot to mention the Pterodactyl which flies around and loves to eat fleas.

This program is quite addicting due to the excellent graphics and the smoothness of the animation. Although it is easy to play, it is another thing to master. I myself have not been able to get Bugaboo out of the pit, although I keep trying. This game really shows off the graphics capabilities of the T/S 2068.

A second type of computer game is the traditional board game. Chess is the classic board game to be played on a computer. More than a dozen or so years ago, when I took a programming course in college, I discovered a three-foot stack of punch cards which, when fed into our IBM mainframe computer, would allow the user to sit at a typewriter and play a game of chess against the computer. No graphics, but it played a strong game. Today, there are quite a few chess games available for every popular home computer, and the Sinclair computers are no exception. In fact, by checking the companies which are selling-out the existing T/S 1000 software, you can probably find a number of different versions for your T/S 1000/1500. If, however, you have a T/S 2068, and really want to show it off, Softsync (14 East 34th Street; New York, NY 10016; (212) 685-2080) has a chess program called Voice Chess. Voice Chess allows for six different levels of difficulty, so that you can choose the level which gives you the best challenge. In ANALYZE mode, you can set up the board in any manner you like, and continue to move pieces, or return to PLAY mode and see how things progress. You may enter (or re-enter) ANALYZE mode at any time. You also have the option of switching sides at any point in the game. This program, like all good game programs, allows you to SAVE any game in progress, and then reLOAD it at a future time. At any time during the playing of a game, you can see all the prior moves, and make a copy of them along with a copy of the chessboard.

When you choose to enter the PLAY mode, you will be asked to choose your level of play, and the color you want to play. Moves are typed in using grid coordinates rather than the traditional chess notation, which simplifies the entry of moves but makes entering the traditional game more difficult. As the name denotes, there is a routine which causes the computer to actually talk to you during the game. It states your move, often accompanied by a witty (?) remark, after

Continued on page 62

Some Short Projects For Your Timex Sinclair Computers

by Patrick M. Spera

Not too long ago, (give or take a few years), I came home to a strange sight. Piled before the desk I used as my computer station was a foot deep mound of thermal printer paper. On the desk, my TS2040 printer was happily "Whiirrr-CHUCKing" to itself. It was trying in vain to spew forth paper from a now emptied spool.

After resisting several violent urges and merely unplugging the printer, I settled to the fun task of rolling the paper back onto its spool. This wasn't the first time it had happened! It seems if you turn off your computer and not your printer, the TS2040 will dump its paper. Usually it happens when you are not around to stop it.

Now people that have the ZX printer don't have to worry about things like that. When you shut off the computer, the printer is also shut down. because the ZX uses the computer power supply.

The TS2040 has its own 24 VAC power pack, so even when the printer is turned off, via the OFF button, the printer is still running! The thermal heads of the printer are continuously powered to insure that the heads are ready to print upon notice from the computer. The only thing the OFF button does is to disable the drive motor.

So, you are probably asking yourself, "Why doesn't he just start pushing the OFF button when he is done using the computer?" Well, I'll tell you. First, I didn't even pause to consider that idea. Second, I wouldn't have anything to write about. So, instead of doing the obvious, this is what I came up with while I re-rolled that spool.

Since I was having this problem with my ZX81/TS1000 computer set-up, I designed the circuit shown in **Figure 1.** It takes advantage of the fact that the input power to these computers is 9 to 12V DC. (Same as the ZX80 and Spectrum, but not the TS2068. It's input power is 15V DC.) By using a 12V DC relay and a STSP switch, I was able to ac-

Continued on page 62

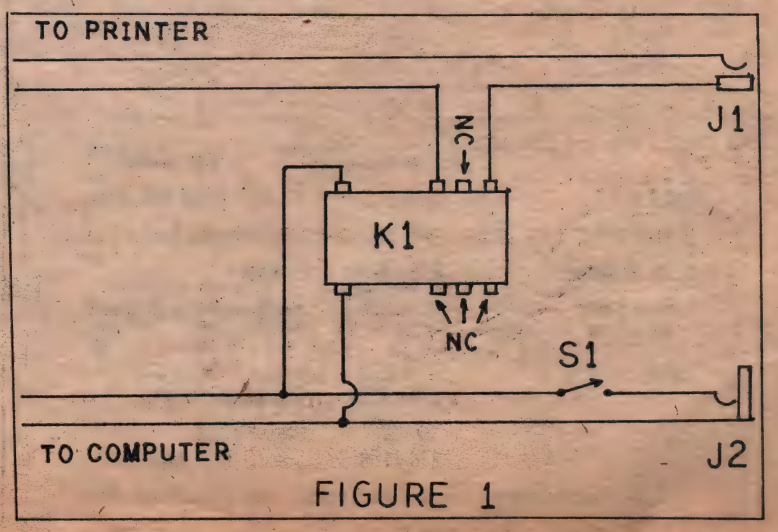


FIGURE 1

Timex-Sinclair Survival
Continued from page 61

you type it in. It also speaks its moves as well as suggestions. You may turn the voice feature off if it bothers you. The voice is produced through the T/S 2068's sound synthesizer. In all but the easiest level, you may request that the computer suggest a move which you may, or may not accept.

The time between moves is determined by the level of play you have chosen. On the most difficult level, I have seen moves take an hour or more. The lower levels, however, take less time between moves, and are more suitable for a "real time" game. Levels five and six are best used for correspondence chess games.

If you have been reading this column since the beginning, you know that Timex had originally informed me that Scrabble, published by Sinclair in the U.K., and demonstrated by Dan Ross at the BCS Timex celebration, would work on T/S 2068. After trying to order directly from Sinclair and being told that I could not due to distribution agreements with Timex, I finally obtained a copy when a friend was in England. I was disappointed to discover that it was in machine code, and did not work on my T/S 2068. Happily, though, the Spectrum Emulator made its appearance very shortly thereafter, and I was finally able to play Scrabble on my T/S 2068. It was worth the wait. The entire Scrabble board, including colored double and triple score spaces. (If you are using a black and white T.V. or monochrome monitor, an option is available which creates a board designed just for you.) The computer will play up to four positions, or up to four human players may compete. You are asked how many players are playing, if any are to be played by the computer (which can play at one of four levels of difficulty), and if you want to see the computer think. This last option is quite interesting since you can see the computer try to find the best possible word. The computer has a vocabulary of over 11,000 words which places it on the level of any average college student. It will even challenge you if you place a word it does not recognize.

With the Spectrum emulation devices available, Scrabble can now run on your T/S 2068. You can even order it with very little difficulty from Software Supermarket (87 Howards Lane; London, SW15 6NU). They have a large catalog of Spectrum software, and accept orders placed on Visa or MasterCard which makes the exchange of currency simple. With the strength of the dollar against the British pound you can get some very inexpensive software of all types. Best of all is the fact that they get your order to you faster than most American based companies. You can expect your package to arrive in about a week after you mail (airmail) your order to them.

Another superb adaptation of a popular board game, also available from Software Supermarket, is "Go To Jail" from Automata U.K., Ltd. As you probably can guess, this is based on Monopoly. In fact, it is an exact reproduction of that famous game, complete with a scrolling board. The first thing you will notice is that the familiar properties such as Boardwalk and Park Place are nowhere to be found. Keep in mind that this is British software, and this game is based on the version of Monopoly which is sold in England, and shows English properties. Go To Jail allows up to five players, and one of them may be your computer. All the rules and features of Monopoly have been incorporated in this program, including a set of Chance and Community Chest cards which the computer holds and reads to you at the proper times. The computer spins the dice for you and shows you the board as you move around. You buy, sell, swap, mortgage, unmortgage and improve properties (by building houses and hotels) as you would in the board game. The computer automatically keeps track of the bank and possessions, which you may check at any time. It will even offer for auction the properties of any player who goes bankrupt. Of course you may SAVE any game in progress and reLOAD and continue later. Never again will you be at a loss for a willing partner. Written for a 48K ZX Spectrum, it requires one of the emulation devices to work on a T/S 2068.

We move along now to the adventure game, which has become so very popular on computers. Once again we have to look to England to find the adventure that all others are being compared to, The Hobbit, from Melbourne House. Since I have long been a fan of that classic fantasy by J.R.R. Tolkein, I purchased this program (also available from Software Supermarket) and was not disappointed at all. This adventure generally follows the book, so instead of the usual cheat sheet, this program comes with a copy of Tolkein's novel. All of your clues can be found within its covers. Small modifications have been made to make it more challenging, but having read the book you are well prepared for this adventure in which you are Bilbo Baggins, the Hobbit.

In addition to the novel, you also receive a sixteen page instruction manual which explains the workings of the Inglish language (which is remarkably similar to English) that is used to instruct the computer. This program also incorporates features Melbourne House calls Animaction and Animtalk.

Animaction is the feature which causes the adventure to be different each time you play it. In most adventures everything that can happen is predetermined, and occurs identically each time the game is played. The Hobbit is different in that each character has a personality of its own, and goes about its business whether they are involved with you or not, while most adventures are frozen until you type in a response. Characters interact with each other even if they are not in your current position. While you wait, the adventure continues.

Animtalk allows you to actually talk to the other creatures in the adventure. Because they have a personality of their own, however, they may or may not listen to what you have to say.

When you ask for your score in The Hobbit it responds by telling you what percentage of the adventure you have mastered. So far I have gotten as far as 57.5 percent. This one will keep you hooked. The Hobbit requires an emulation device.

The final game we will look at this month is of the database type. Trivia Machine from Curry Computer (5344 W. Banff Ln., Glendale, AZ 85306, (602) 978-2902, capitalizes on the current trend towards games specializing in trivial facts. This game is for two to four players, and presents one of over 800 questions in a random order. The first player to reach 100 points is the winner. Questions cover a vast assortment of topics and really test your knowledge of trivia. Beware though, this game can be addicting. Written on and for the T/S 2068, it does not require any add-on devices. ●

Short Projects
Continued from page 61

complish two things: 1) I was finally able to be sure that the printer was OFF when I was through with it; and, 2) I finally got an ON/OFF switch for my ZX81/TS1000 machines!!!

I constructed my version using point-to-point wiring and a small project case as a housing. I've been using it for several years now without a hitch. The relay I used was a 12V DC DPDT DIP relay. It is designed to be placed into a 16 pin IC socket. All the parts can be found at your local Radio Shack or electronics store. The total cost of the project should be under $12.00. For those of you who like to burn PC boards, I've included a diagram for you. **(Figure 2).**

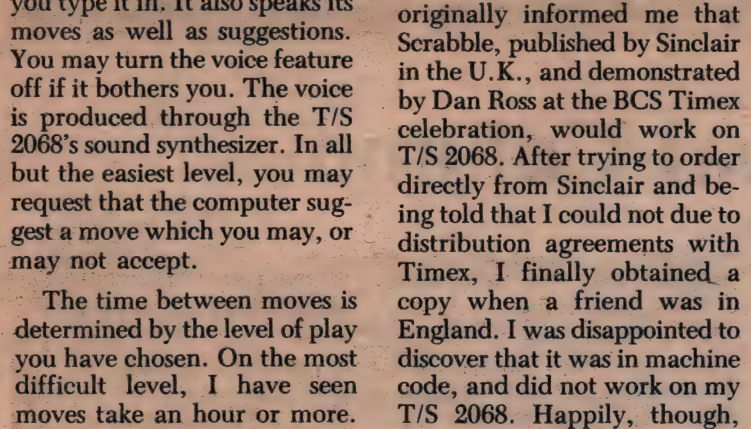
Timex Command Cartridge (TCC) Case

When the TS2068 hit the market, one of the things the PR people boasted about was the fact that the TS2068 would have a cartridge system. Yesiree!! It was to be smaller than a pack of cigarettes, yet having up to 56K of ROM on each cartridge. It sure sounded grand, eh? Well, the TCC fell the way of the Saber Toothed Tiger and "Sync" magazine. But, the lucky few who did manage to get some cartridges now have a small problem. Where do you store the little devils!! If Timex had stayed in the game, I'm sure they would have marketed a TCC case. Or perhaps a third party would have picked up on it. Since no one did, I'll tell you my solution.

Digging into my scrap wood I managed to find some pine wood stripping and hard balsa sheets. You should be able to find these items at any well stocked hobby shop. I used ½"by ½" and ½"by ¼"pine, while the balsa was 1/16" by 3". I also gathered my wood tools, wood glue, shelf covering and four self-sticking rubber feet.

Looking at **Figure 3**, you'll see that you can make the case fit your needs. Just keep stacking the sheeting and the stripping alternately. This produces the required number of cartridge slots. I happen to require six slots as illustrated in **Figure 3.**

Completing the case, I covered it with "natural wood" shelf covering. This gave it a professional appearance. It also adds protection and strength to the balsa sheeting. Place the feet on the bottom and the case is complete.



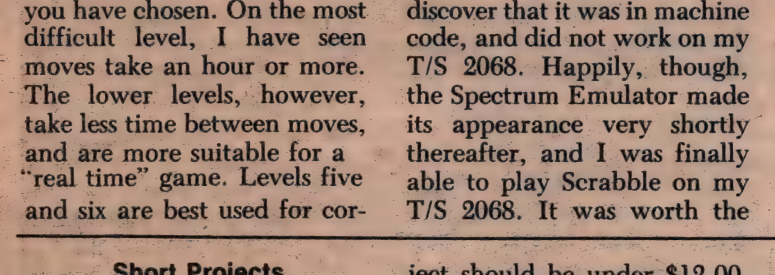


FIGURE 3

Part	Radio Shack	Description
Relay K-1	275-213	12 VDC DPDT DIP Relay
Switch SW-1	275-625	SPDT Toggle Switch
16 pin socket	276-1998	IC socket
IC board or PC board	276-159	Experimenter's IC Board
Jacks	274-253 274-1565	Phone jacks 1/8" Coaxial Pwr Jacks
Plugs	274-287 274-1569	Phone plugs Coaxial Pwr Plugs

Miscellaneous: Wire, Project box, solder, and a few hours time.

Boosting Your BEEP

So, you've just completed your opus, "Rhapsody in BEEP" and want your computer to play it for your User Group. Well, that's find, but the TS 2068 just doesn't have the volume to be heard across a quiet room, let alone in a crowded meeting hall. What can you do to boost the volume of the BEEP sound? It's a lot simplier than you think, there is nothing to build. When you initiate the BEEP function on your TS2068, the sound is sent to two places. It goes to that tinny sounding speaker and it

Continued on page 78

HEWLETT-PACKARD

Inside The HP LaserJet

Industry observers predict that 1985 will be an explosive year for the nonimpact printer. Nonimpact printers, using primarily laser technology, represents the fastest-growing worldwide printer market.

Nonimpact printers will grow on a market-value basis to approximately $1.958 billion in 1987 (60.5% of revenues of the 1987 market), up from $622 million, year-end 1982 (1).

The proliferation of personal computers (PCs) and the trend toward clustered-office workstations is responsible for sparking much of this growth. The printing speed, volume, and flexibility requirements of the clustered-workstation environment and the price/performance ratio expected by PC users have created a new and growing market niche for the low-priced laser printer.

Laser Printer Trends

Laser printers traditionally have been used with large computer systems. Their popularity has stemmed from their ability to print quality text and graphics on a variety of different forms at high speeds, typically 12,000 lines/min. (or approximately 200 pages/min.).

This ability to print volumes of information at high speed has often brought with it a high price tag. However, these printers are usually shared by 50 or more users, bringing down the price per user.

Now new designs and improved technology have brought the price of laser printers into the realm of personal computers. Japanese photocopier companies like Canon, who developed the laser-print engine used in the HP LaserJet printer, have been instrumental in driving down the price of laser printers.

Canon has used its expertise in manufacturing photocopiers to develop an inexpensive laser-printer design using a disposable cartridge and consisting of toner, developer, drum and light receptor.

A semiconductor laser, rotating multifaceted mirror and focusing optics make up the laser-print engine of the LBP-CX that Canon developed. Hewlett-Packard's LaserJet printer uses this LBP-CX design as its core in addition to HP's own interface and informatter.

Data is received from the computer in ASCII code just as in any other printer and is held in a print buffer. The ASCII code for each character serves to identify the dot matrix format for each character contained in a character generator ROM. It is this dot matrix that causes the form of the character to be printed. In a dot matrix impact printer, a series of pins are struck through a ribbon to produce the character image on the paper. In a laser/xerographic printer a semi-conductor laser beam is directed onto a drum by a multifaceted rotating mirror. The drum is coated with a photoconductive material and is given a positive charge of electricity. The laser, unlike a beam of light is coherent and its beam does not spread over distances. The laser beam is used to impress the dot pattern forming the characters on the drum. Wherever the laser hits the drum, the positive charge is dissipated leaving a latent image on the drum. As the drum revolves, the entire page is reproduced on the drum as a latent image. Now the positively charged toner is applied to the drum. In the areas not exposed by the laser, the toner does not adhere because positive charge repells positive charge. In the areas exposed by the laser the toner adheres to the drum.

The paper is given a negative electrical charge as it enters the printer. As the paper exits the paper path, it passes through the heated paper rollers and the toner is fused to the paper.

Hewlett-Packard has applied its four years of experience in manufacturing laser printers to the design of its new printer. Like HP's large laser printers, the HP 2680, 2687A, and 2688, designed to print approximately 30,000 pages a month, the HP LaserJet printer formats one page at a time versus character by character, resulting in a speed of 8 pages per minute. Prints 300-by-300 dots-per-inch resolution, uses multiple character fonts, mixes text with graphics and has advanced interfacing capabilities.

In addition, the new LaserJet produces true letter-quality output at eight times the speed of most daisywheel printers. Virtually silent operation (55 dBA) and good reliability eliminates the most common frustrations voiced by daisywheel printer users.

The new LaserJet is designed to operate with personal computers such as the HP 150 touchscreen personal computer, the IBM PC and IBM-PC compatibles.

Compatible With Major Software

Compatible with major existing software packages such as 1-2-3™ from Lotus™, Multimate, WordStar® , PFS Write and BPI Accounting, the LaserJet printer can print either horizontally for business correspondence or vertically to create spreadsheets using a compressed character font.

In addition to a standard typewriter Courier 10 font, which comes with the printer, the LaserJet printer offers up to four fonts in plug-in cartridges. With these cartridges, the user has the ability to mix four typefaces on a page. Courier fonts in bold and italics, and a compressed font are all available.

A number of additional font cartridges are under development and are planned for release later this year.

With the HP 150 touchscreen personal computer, the LaserJet printer has built-in raster-graphics capabilities and is compatible with screen-copy graphics on the HP 150. In addition, graphics printing can be done under program control from either the HP 150 or IBM PC.

Unlike many other personal printers, the LaserJet uses standard cut-sheet paper plus legal-size paper and European sizes A4 and B5. Bond paper with preprinted letterhead, envelopes, labels and transparencies designed for copiers are among the materials the user can process on the LaserJet personal printer.

It comes with a built-in sheetfeeder, which can handle 100 sheets of paper at a time. Besides the ability to feed paper automatically, it can be fed odd-sized paper one sheet at a time. Two-sided printing is possible using manual feed.

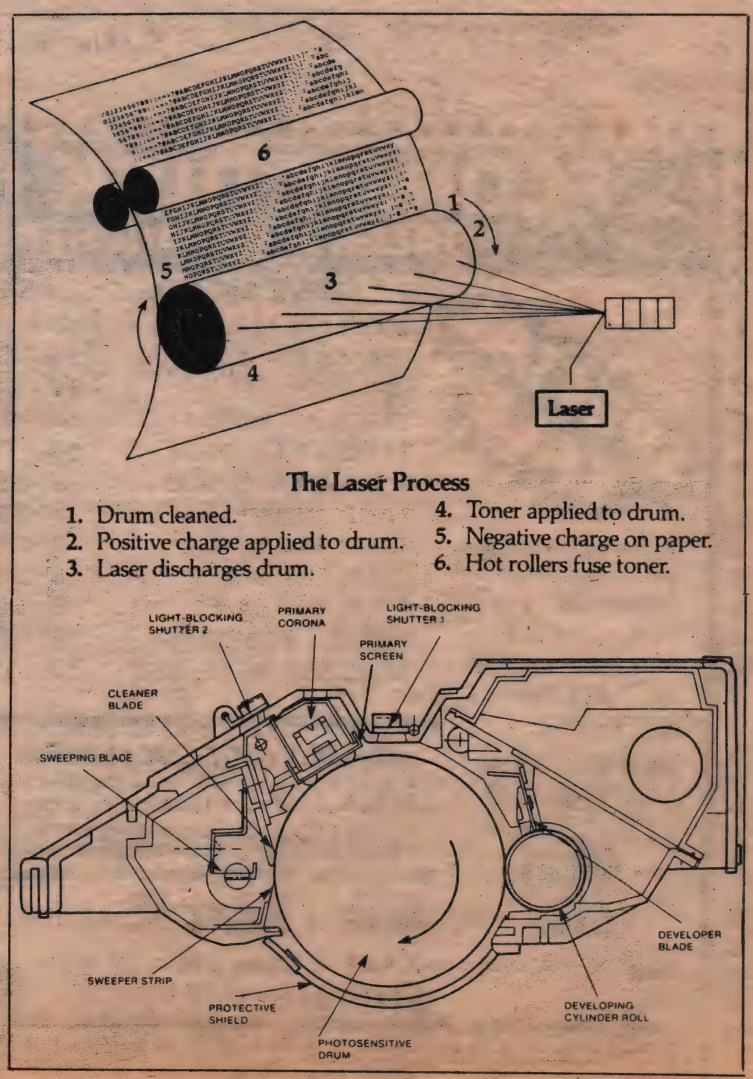
Instead of changing a messy ribbon cartridge on a conventional printer, the user simply snaps in a disposable cartridge in the LaserJet printer. The cartridge lasts for about 3,000 pages of printing. Cost of using a cartridge is approximately 3.5 cents per page, less than a daisywheel film ribbon.

"Replacing the cartridge lessens repairs and minimizes routine maintenance". The LaserJet is able to produce extremely consistent print quality because, when the electrophotographic cartridge is changed, all the key-imaging components including the drum are replaced each time. This makes the LaserJet printer simple to maintain.

The HP LaserJet printer quietly prints eight pages a minute including spreadsheets and graphics when connected to the HP 150 touchscreen personal computer. It also operates with the IBM PC and IBM compatibles.

The LaserJet personal printer (HP 2686A), with Courier 10 font, multiple typefaces, disposable printing cartridge, built-in sheetfeeder and standard RS-232C interface, is priced at $3,495. Additional disposable printing cartridges are $99 for one and $89 each for eight or more. Plug-in font cartridges containing three fonts sell for $225 each.

Prices are expected to come down in the future. ●



The Laser Process

1. Drum cleaned.
2. Positive charge applied to drum.
3. Laser discharges drum.
4. Toner applied to drum.
5. Negative charge on paper.
6. Hot rollers fuse toner.

Computer Books From The Government

by L.J. Kutten

Many of the best bargains in computer oriented books are available from the United States Government. Through the Government Printing Office (GPO), the vast storehouse of the Government's knowledge and information is made available to the public. The cost for this information is cheap. A two hundred page book costs on the average of $6. Nearly all of this material can be reviewed free at any Government Depository Library.

A Depository Library receives a copy of everything that the U.S. Government publishes and releases to the general public. There are hundreds of such libraries located throughout the country. For example, in the St. Louis metropolitan area alone, there are five libraries: the City of St. Louis Public Library, St. Louis Public Library, St. Louis County Public Library, St. Louis University Library, University of Missouri-St. Louis Library, and Washington University Library. It does not matter if the depository library is privately owned or maintained. So long as you want to look at government documents, you have the legal right to use the Library. The Library cannot keep you out or otherwise restrict your use.

Another nice aspect about government material is that it is all in the public domain. If you want to reprint something, you can and you do not have to get anyone's permission.

New material is released every month. For the comprehensive list of new Government materials, examine the monthly index. The complete GPO catalog is available on many on-line data services,e.g. BSR and Knowledge Index. Additionally, the GPO has a March, 1984, catalog listing the materials available to date in the computer area. It is called Subject Bibliography 051(SB-051), 'Computers and Data Processing.' You can get a free copy by writing the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The following is a short description of seven books I recently examined. For each book, I have listed the title, stock number, Government call number, number of pages, price, and a short description. The stock number (e.g.S/N 008-047-00256-4) is necessary if you want to order it from the GPO. The Government call number (e.g. C 13.10:500 - 117/v.2) iss needed if you want to find the material in a depository library.

1. Digital Computer Basics - S/N 008-047-00256-4; D 207.208/2:C 73/2/978; 302 pages; $8.50. This book, written for the Navy, in intended as a basic reference for all Naval personnel whose duties require them to have a knowledge of the fundamentals of data processing. It covers central processors concepts, input/output concepts, programming concepts(including logic functions), and operation of representative data processing circuits.

2. Management Guide for Software Documentation - S/N 003-003-02384-1; C 13:10:500 - 54; 44 pages; $3.00. This guide was prepared to assist managers in establishing procedures and policies for the effective preparation, distribution, control, and maintenance of software documentation which will aid in the re-use, transfer, conversion, correction, and enhancement of computer programs.

3. Computer Crime: Computer Security Techniques - S/N 027-000-01169-1; J 29.2:E1 2; 219 pages; $7.50. This book describes the result of a major review of over 80 computer security procedures which are currently employed in the public and private sectors. It describes and classifies over each in terms of strengths, weaknesses, cost and target vulnerabilities.

4. Care and Handling of Computer Magnetic Storage Media - S/N 003-003-02486-4; C13.10:500-101; 136 pages; $5.50. This book tells how magnetic media should be handled and what enviromental considerations should be instituted to control day-to-day and long-term archival of magnetic media. It also tells how magnetic media should be transported and what to do in the aftermath of a catastrophic event that damages the media

5. Selection and Use of General Purpose Programming Languages: Program Examples; S/N 003-003-02613-1; C 13.10:500-117/v.2; 180 pages; $5.50. This publication gives program examples to illustrate the features of the major program languages. It includes Ada, Basic, C, Cobol, Fortran, Pascal and PL/1.

6. Computer Education: A Catalog of Projects Sponsored by the United States Department of Education, 1983; S/N 065-000-00202-7; ED 1.302:C 73; 315 pages; $9.00. This book provides an overview of the general types of 275 computer education projects which were on going during 1983. Types of projects include developing computer literacy, computers as instructional aids and use by educators, research and evaluation, and multi-purpose computer education projects. It provides the names and addresses of people to contact for further information.

7. Introduction to Programming in BASIC; S/N 008-047-00361-7; D 207.208 /2:P 94/983; 184 pages; $4.50. This book was prepared as Rate Training Manual and Correspondence Course for Navy Personnel. It provides a hands on introduction to BASIC programming. Each chapter includes exercises and suggested solutions.

Each of these books can be ordered directly from the GPO. You can pay by check, VISA, or Mastercard. Expect a 4-6 week wait for delivery. ●

Rio Grande Robotics Signs As Exclusive Distributor For Excalibur Technologies SAVVY<R> On Apple II Series

Rio Grande Robotics Corporation will assume all marketing and support functions for the APPLE versions of SAVVY<R>, the natural programming language developed by Excalibur Technologies Corporation, under a new agreement between the companies.

"SAVVY is the best kept secret in the educational computing field," says Niki Delgado, president of Rio Grande Robotics. "It is so powerful that people with computing experience expect it to be complicated. They look for all the usual bureaucracy of computer languages. Kids don't look for artificial problems; they grasp SAVVY power immediately. Our research on educational applications of SAVVY has produced startling results, and we plan to move strongly into CAI, and teacher-programmed systems that have been impractical in the past."

"We're impressed by the aggressive development work Rio Grande Robotics has invested in SAVVY applications," says Bob Pinto, national sales manager for Excalibur Technologies. "We had suspended sales of our Apple-based SAVVY product because Apple's switch from the IIe to the incompatible IIc restricted our market for the existing product, and we elected to put our development resources into the IBM-based version of the product, SAVVY PC.

"This move by Rio Grande Robotics to handle all marketing, and customer support for the existing Apple-based SAVVY product, concentrating on education, is excellent. They've done remarkable things with SAVVY. They started with RCL, the Robot Control Language we designed for RB Robot Corporation, and have moved on to intensely practical SAVVY applications in bilingual programming, and work with the handicapped. Their special knowledge of the education market gives them access to the hundreds of thousands of compatible Apple systems in the schools."

Contact Rio Grande Robotics, 1595 W. Picacho, #28, Las Cruces, New Mexico 88005.

Mention that you read it in Computer Shopper. ●

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TANDON TM100-2	5¼" DS/DD	$179	$169
TOSHIBA MKM0121	8" SS/DD	$229	$209
TANDON TM848-1	8" SS/DD	$149	$139
TANDON TM848-2	8" DS/DD	$235	$225
SHUGART SA801	8" SS/DD	$199	$189
SHUGART SA851	8" DS/DD	$275	$265
PERTEC FD511/510	8" SS/DD	$375	$350
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VISA

Hitchhiker's Guide Continued From Page 22

review is being completed before the InvisiClues Hint Book for Hitchhiker"s has been readied for market. (For new Infocom game players, InvisiClues are available from Infocom, at a price of $7.95 each. These hints and maps are designed to help you on your journey, when the going gets rough. The Hitchhiker"s game package contains the necessary form to obtain them. InvisiClues are available for all Infocom games.)

The hints that I am revealing here will make the going a bit easier, but there are many puzzles to solve in this game, and these clues are only a beginning, a step along the way, towards solving them.

* **The Babel Fish.** It is necessary to put the Babel Fish in your ear. It does work as an excellent translator. How do you get the Babel Fish in your ear? Junk Mail. That is all I will say.

***The Guide.** When you are given the electronic version of the guide, you are told to consult it often. Do. The first thing you might want to question it about is the Vector Plotter. And don't forget to look up Fluff. Fluff is a key element in this game. So is tea. And no tea.

***The Improbability Drive.** Be sure to set up the Improbability Drive, from within the Heart of Gold. Use the Improbability Drive time and time again, to solve problems. The answer to the Bugblatter Beast of Traal puzzle is contained in the Improbability Drive.

***The Yapping Dog, and The Cheese Sandwich.** Just before you leave the pub order a cheese sandwich. As soon as you exit the pub feed the cheese sandwich to the dog who will appear yapping, just outside the pub.

Notice, as you do this, that there is a microscopic space fleet floating by. Much further on in the game, you will find yourself in that microscopic space fleet floating past that tavern door. If you had not fed that cheese sandwich to the dog, he would have been ravenously hungry by the time that space fleet floated by.... and you can guess the rest.

When playing Hitchhiker's, bear in mind that the computer will not always be telling you the truth. Twice in the game the computer deliberately lies to you, telling you that you can not go places that you actually can go. If you've been told that an exit exists, and then upon trying to leave via the exit the computer refuses to permit you to exit, just keep trying. After giving the computer the same command several times, the game will slyly admit the deception, and permit you through. According to Steve Meretsky, these deliberate lies have been included to prove to people that computers are not to be trusted. For players of the game, the lies are just one more pitfall to overcome in this puzzle filled game.

These deliberate and funny lies mark a first for computer games, as does the notion of leaving your computer body, the body of Arthur Dent behind and finding yourself manipulating several other characters, who you become for short periods of time in the later stages of the game. Also mentioned within the game is the promise of a sequel, and Adams says that plans to write this second adventure are in the works.

The Hitchhiker's Guide To The Galaxy is a complex, funny game. Do not expect to solve it in the first week of play. Keep your towel at your side, read through all game text carefully, stay loose, and, "Don't Panic". ●

Least Squares Continued From Page 37

Conclusion

The Least Squares Curve Fitter would certainly be useful to anyone whose requirements include analysis of sets of numbers. For you, I highly recommend the program. The program is well documented and user friendly.

I was able to locate only one bug in the program; when you exit the program after having printed a graph, some characters are sent to the printer and printed out. Aside from wasting a good piece of paper, it shouldn't do it.

Furthermore, remember that the program can only be used fully if your equipment configuration includes an Epson/IBM compatible parallel printer; the current version will support no other printers.

This software should be viewed as a low cost serious application program; software designed to do the kind of things we bought computers for in the first place.

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Portable Perils
Continued From Page 38

others are beginning to charge for it. When deciding on software, choose with support in mind. Also, take time zones into account when examining telephone support. (A few support providers have electronic "bulletin boards" as well as voice lines for trouble calls.)

As with hardware support, purchase of continuing software support may be a worthwhile investment. Some manufacturers and dealers are beginning to offer such contracts. Micro Support (Sausalito, CA) specializes in telephone support for almost all "off the shelf" business software. The firm offers both support contracts and "per call" help to individual users and organizations.

Unless you are part of a corporate purchasing program, you will probably purchase your software through retail outlets, or from mail-order discounters. Ask software retailers about their participation in dealer training programs, and get feedback from current (or former) customers. With mail-order discounters, be prepared to "pay" for lower prices with less support. If you expect to need more than basic support, particularly on the road, select your vendor carefully, discount or otherwise.

Users Groups

New or experienced user, you will invariably have questions that go beyond your dealer's expertise and your patience with being put on hold by product providers. One valuable source of answers is the users group. National, regional and local groups exist for most of the popular machines, operating systems and business applications packages (especially Lotus 1-2-3/Symphony, dBase II/III and WordStar). Some large corporations, including Bechtel of San Francisco, have users groups made up entirely of company employees.

Users groups may not answer all of your questions, especially if the group you find has more hobbyists than business people. However, participation can provide valuable access to other contacts and sources of information. For example, if you are thinking about buying new software or hiring a consultant, the experiences and opinions of users group members can help you with your decision. Users groups almost always have a wealth of free or inexpensive software available to members as well.

If you get frustrated enough, you can start your own users group! Get a few other users together, and start with periodic informal discussion group. Compile a list of problems experienced and solutions discovered by group members, to avoid numerous reinventions of the wheel. Also, negotiate with local dealers to offer discounts and other benefits to group members. A group will almost definitely carry more clout with vendors than a lone, confused user—especially as membership increases.

Summary

Portable computer systems are subject to all the problems of their desk-bound cousins—and then some. Movement not only increases the likelihood of something jarring loose or breaking, but often places the computer even further than usual from sources of help. New systems should be purchased with this fact in mind. Where and how often you travel with your computer is at least as important as what you do with it.

The dealer is the first line of support for most hardware and software, but is often constrained by costs and limited support resources. Manufacturers are ultimately responsible, but user access to manufacturers is uneven at best. Support and service contracts for hardware and software are available for many products. For many users, such agreements are the best available protection against the problems that will eventually arise despite the most careful preventive planning.

The swamp is dark, and the alligators numerous. Shop for support at least as carefully as you shop for your hardware and software. If shopping doesn't answer your questions, get reliable advice. Make use of users groups; start one if you can't find one. Your satisfaction with your system, at home and on the road, is as important to the growth of the industry as it is to you. Careful planning and good advice will increase the chances that you'll be satisfied—even if (when?) you turn the switch on, and . ●

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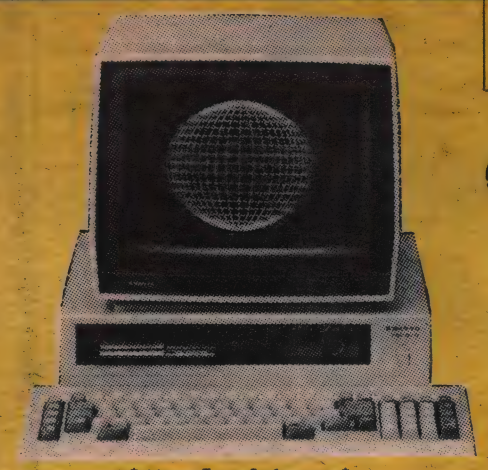

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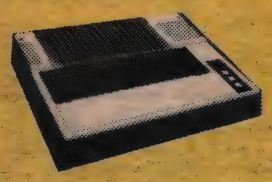

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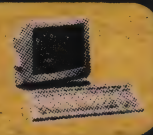

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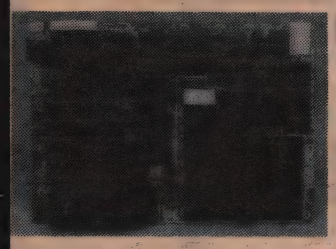

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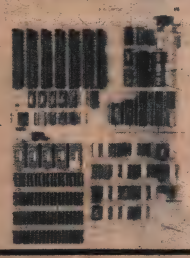

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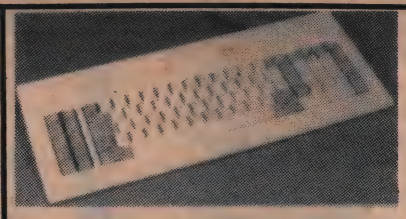

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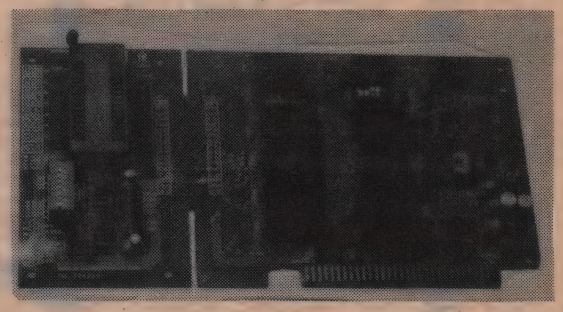

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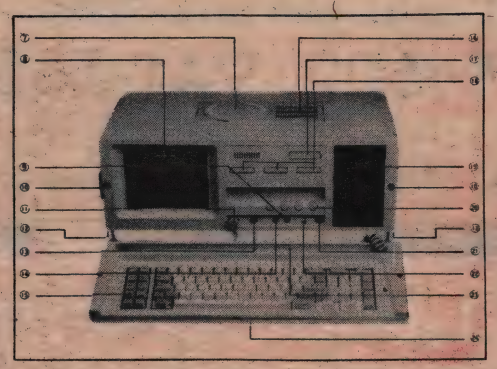

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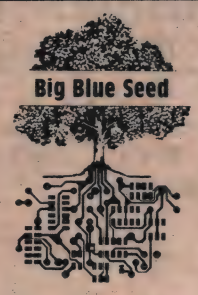
Buying & Selling
Continued From Page 38

puter you are considering buying, have a friend with the same kind of computer lend you some master disks from his software. The ones that say "Copy this master and put it away in a safe place." BE SURE THEY ARE WRITE PROTECTED. Using these master disks is a quick way to check disk alignment of the computer you are considering. If you use the disks made on the computer, the drives can be slightly out of alignment and they will read their own copies, but not a copy made on a good drive. It is a good idea to insist on a disk alignment as a condition of purchase. It is not a big deal, but it is better to let the seller have the trouble than you!

There are certain models of computers that had inherent problems corrected in later models. The lack of gold plated connectors on early TRS-80 Mod 1 caused all kinds of trouble. In fact people bought gold plated connectors and installed them to correct the problem and Radio Shack went to gold plated connectors on the last Mod 1s sold. Don't buy one of these tin plated connector Mod 1 computers. The kit to convert them is still sold but it is not cheap because gold plated connectors are not cheap.

Another computer model with problems was the first Quad Density Superbrain. These used the first high density disk drives and they could never hold alignment. Again Superbrain corrected the problems in later revisions but there must be some old ones on the used market. Old SOL computers developed problems with corrosion inside the chip sockets, after a number of years. I don't know exactly how you can identify these computer problems but be aware they exist. How can you find out which computers had problems or were "dogs?" Attend a meeting of a User Group for that computer and ASK. Or go to the special interest group SIG of your nearby computer club. The club members are looking for new members and they will be glad to help. You will find the nearest club listed in Computer Shopper.

Next Month - How much to pay, or ask for a used computer. ●



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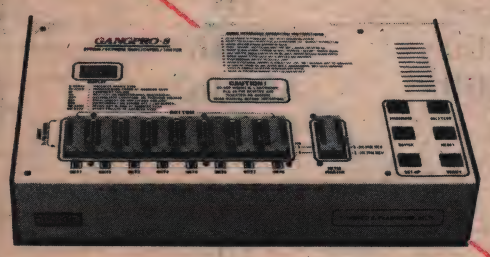

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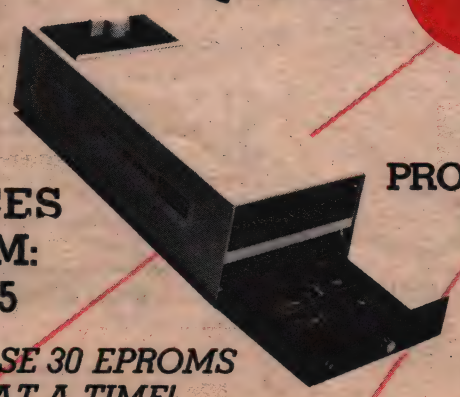

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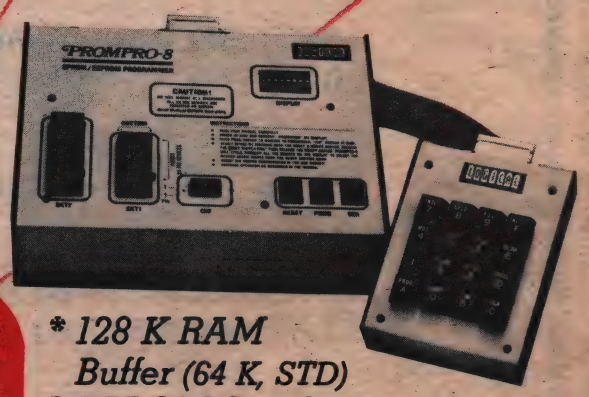

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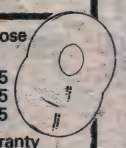

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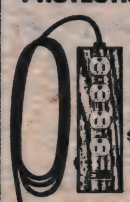

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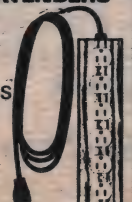

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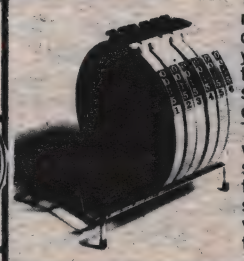

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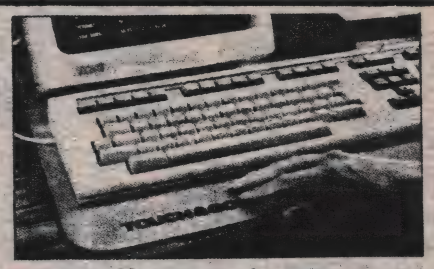

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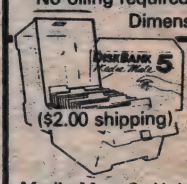

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TRSDOS
Continued From Page 42

that two drives (out of 16) have had to be aligned by a serviceman.

The other area of maintenance that I have found that will eliminate service work is keeping the keyboard clean and covered when not in use. I use a small vacuum on the keyboards and when needed I remove the cover to get to the keyboard to get all the dust possible. We have had one keyboard problem in three years and that was an internal service problem.

This program is supplied on a formatted non-system diskette to be used in drive 1. Simply call for "DIAG" and answer the prompts. You will be asked for the RAM size of your machine and whether or not you want to protect the high memory. This is necessary if you have drivers that must be protected while the program runs. If you have a Model I or III you will be asked if there is a cassette recorder. Next the prompt asks if there is a line printer and if there is upper and lower case (Mod I). Information about RS-232 and disk drives is requested. The last prompt asks if the output is to go to the line printer. If you answer "YES" then any errors encountered will be reported on the line printer.

Once the system inventory is completed the master menu is displayed with 5 options: (1) Continuous System Tests, (2) Individual Tests, (3) Respecify System Inventory, (4) Save configured program, (5) Exit Program. Respecify System gives you the option to change your system configuration and Save provides the option to record the system configuration. Once the program is saved with your configuration it starts from the main menu, bypassing the prompts at the beginning of the program. Be sure to save it as a /CMD file and don't overwrite your master DIAG program on the distribution disk.

If the Continuous Test option is used it will run the RAM, ROM, Video, Disk Drive and RS-232 tests in an endless progression until you break the operation. This allows you to check for those errors that occur intermittently. These are the problems that drive you nuts as they will never show up when a service tech is looking at the machine. The Individual Tests option lets you select which tests to run without running the entire battery.

The ROM Test compares the checksum for your ROM against the known ROM values for your machine. Since all ROM checksum values are known (presumably) this is a very accurate test for the TRS-80. It is possible to get a different value and still have a good ROM due to the fact that Radio Shack or some other manufacturer may have produced a ROM with a value not known to Howe. If the answer is correct, it is highly unlikely that the ROM has a problem.

The RAM Tests check each location of the random access memory to see if every possible value can be stored and retriev-

Continued On Page 74

IF YOU'RE SERIOUS ABOUT BUYING A PRINTER

We suggest you to do the following four things: (especially if you don't know much about printers.)
(1)Read Consumer Reports, October, 1983.
(2)Gather the specifications and printing samples.
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Apple IIc, IBM Jr.	S-P converter	$335	$445	$379(cable)	$375	$425	$465
Atari, TI99/4A	Axiom	$339	$449	$409	$379	$429	$469
Commodore 64	Xetec GPI-2K	$325	$435	$395	$365	$415	$455
Timex 2068	Aerco	$315	$425	$385	$355	$405	$445
IBM, Kaypro, Osborne, Sanyo:	cable	$285	$395	$355	$325	$375	$415
Printing speed (CPS)/ Buffer		120/2K	160/2K	18/1line	120/1K	160/1K	160/0K

*All of the above printers are dot matrix except Powertype which is a daisywheel printer. These dot matrix ones can do graphics, super-/subscript, underlining, and offer near letter quality printing. SG-10 and SD-10 are enhanced models of Gemini 10x and Delta 10. Now they also offer NLQ printing with 2K buffer. Best buy.

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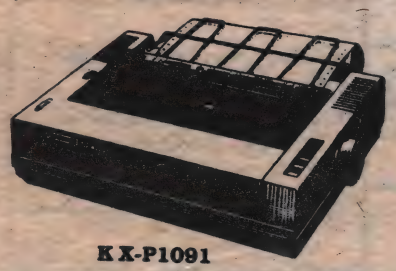
(This portion was printed with NLQ mode of P1091)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TRSDOS
Continued From Page 72

ed in them. In the Model 4 test the lower 64K is designated as the primary bank and the upper 64K is divided into two 32K banks. The test informs you as to which bank is being tested. There are four types of RAM tests: (1) Non-Destructive Test... checks the memory without changing its value, (2) Complete Test... stores every possible value in each address and checks it for correctness. This test destroys the previous contents of the memory, (3) Glitch Test (Model I only).. simulates the starting and stopping of other devices while your computer is running to see if you have a transient voltage problem, (4) Refresh Test...checks the ability of the machine to refresh the data stored in the RAM.

There are three Video Display Tests. (1) Character Generator Test.. prints all the possible characters on your screen, (2) Video RAM Test... fills the screen with every possible character and then checks them for accuracy, (3) Video Signal Test... fills the entire screen with a graphic block which you inspect for straightness and distortion.

The Keyboard Test requires your assistance in pressing each key as instructed. This tests the leads from the keys to the keyboard memory and for intermittent failures.

Line Printer Tests check for single characters per line, diagonal pattern and a line printer exerciser to check the formation of the characters as well as printer operation.

The Cassette Tests check for reading and writing to tape. In order to use the read test a tape must be created using the write test. These tests can be repeated at various volume levels to check the operating range of your recorder. This test is for Model I/III only as the Model 4 does not support tape functions.

By far my most favorite tests are the Disk Drive Tests and they are the most extensive tests in the program. The Menu offers 7 options for drive testing. Before you can select a test you have to answer several questions: (1) Which drive? (2) Track count? 35/40 or specify up to 99. (3) Side? (4) Stepping Rate? (5) Density? (6) Single Density Boot Track (y/n) (7) Sectors Numbered 0-17 or 1-18.

The 7 tests are (1) Drive Select and disk drive controller functions. (2) Track seek and verify read. (3) Formatting. (4) Read/Write/Verify all tracks and sectors. (5) Read/Write /Verify without erasing. (6) Disk Drive Timer. (7) Disk Drive Cleaner. All of these tests are well documented and easily understood. I like the cleaner option that is used with your cleaner disk. The program operates the drive and displays the remaining time that the drivce will be run for cleaning.

The RS-232 Test includes 6 tests to check the Initialization of the interface. The Connector Test, Transmit Data Test, Framing Test, Data Loop Test and a Baud Rate Generator Test. As with the other tests these are well documented.

The documentation for this program is well written and easily understood even by a neophyte to the computer. Using the test provides good basic information for the operator that is not well versed in the operation of the computer. The information is in a vinyl 3 ring binder and is almost 40 pages in length. The diskette is not protected and can be copied without problem. This in itself is refreshing. When you register your purchase with Howe you will receive any information about future updates, changes, fixes or new editions of the program. It also qualifies you to obtain a new copy of the program for $5.00 and a blank diskette at any time.

For the price ($99.95) this is an excellent program. I enjoyed running it from the first time I booted it up. The only problem I had was finding some disk errors when I used a diskette formatted on another machine for the test. After I formatted it on the same machine there were no problems. Both machines checked out OK on separate test runs. Later I found that I was using the wrong step rate so the problem was mine not the program's. Nice work Howe. I will look forward to more from you all.

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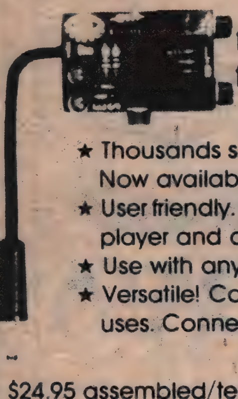

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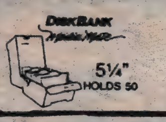

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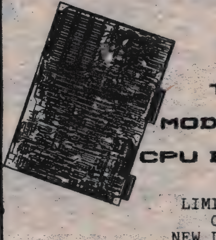

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The Bullet-286 is extremely compatible with the IBM PC/XT and PC - far more so than the new IBM PC-AT product. Any application program or operating system (PCDOS, Concurrent CP/M, UCSD Pascal, Unix derivatives, etc.) available for the IBM PC/XT is extremely likely to run without modification on the Bullet-286. Special-purpose proprietary circuitry on the Bullet-286 reduces to an absolute minimum any incompatibilities between the 80286 and the 8088 microprocessors (and the IBM PC/XT architecture).

The Bullet-286 upgrade gives XT installations a new lease on life without sacrificing existing investments in software, hardware adaptors, peripherals, packaging, etc.

IBM PC/XT Compatibility

Is it really difficult to design a product using the 80286 CPU and still maintain a high degree of 8088 and PC/XT compatibility? The computer industry certainly seems to think so! For example, an article in November 1983 BYTE ("Technical Aspects of IBM PC Compatibility") written by the designers of the Columbia PC flatly states that a truly XT-compatible computer must use the 8088 CPU. The same claim has been boldly stated in several other computer engineering publications. What are the technical obstacles that prompt designers to utter such pronouncements? Why is it so difficult? And more concretely, how successfully has the IBM PC-AT overcome the problems? How do the IBM PC-AT and Wave Mate Bullet-286 compare in this regard? Let's try to answer these revealing questions.

First, the problems:

(1) The 80286 microprocessor has two fundamentally different modes of operation - real address mode and protected (virtual address) mode. Intel claims that the real mode 80286 is 100 percent software compatible with the 8088. Actually, there are several instruction set incompatibilities between the two chips (see Appendix D of the Intel IAPX 286 Programmers Reference Manual for a list of "minor" differences between the 8088 and the 80286 in real address mode).

(2) Another major hassle arises from the fact that the IBM PC/XT uses several exception trap vector locations which Intel has reserved for other purposes on the 80286. (You have to blame IBM for that one, not Intel.)

(3) The most obvious difference between the two chips is that the 8088 CPU has a slow (840 nsec) 8-bit external world interface, while the 80286 uses a very fast (333 nsec) 16-bit external bus, The radically different execution speeds between the two chips can be a major cause of incompatibility: in general, programs which depend upon the XT's 4.77 MHz 8088 clock to generate critical timing loops will not run correctly on a faster 80286 CPU. (Some communication packages fall under this category.)

The new IBM PC-AT has addressed these problems in a few respects only - the 80286's intrinsic 16-bit bus has been multiplexed onto a PC/XT-compatible expansion bus and slowed down by the insertion of multiple wait states. Whether or not IBM has attempted to resolve the exception vector conflict is unknown to us at the present time. IBM claims that the new PC-AT will run "most" PC/XT application programs without modifying the object code, provided the software is "cleanly interfaced" with PCDOS. No claims have been made concerning operating system compatibility - presumably, the two machines require differently configured versions of a given operating system.

The Wave Mate Bullet-286 uses a sophisticated virtual machine emulation approach to resolve the 80286/8088/PC/XT compatibility problem. Instruction set incompatibilities between the 8088 and the real mode 80286 are eliminated by a powerful custom-designed processor circuit that monitors 80286 execution and traps any incompati-

Continued on page 76

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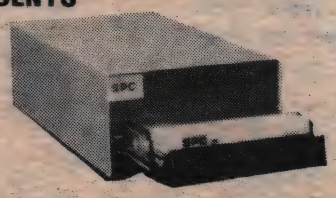

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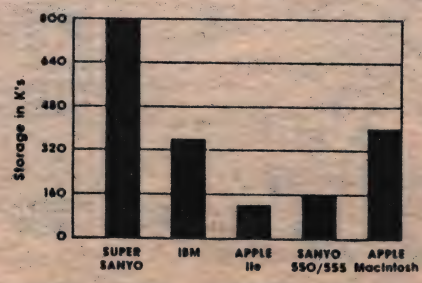

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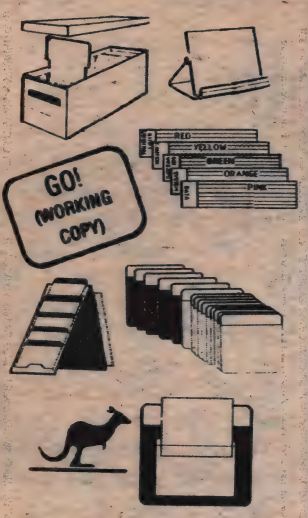

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Bullet-286
Continued from page 75

ble instructions (so they can be emulated virtually). A similar technique is used to avoid exception vector conflicts. The Bullet-286 even reduces the likelihood of execution speed incompatibilities, insofar as this is possible: for example, NO OP delay instructions in software timing loops can be trapped and executed virtually in order to slow down the 80286 inside critical code sections.

The virtual machine concepts of the Bullet-286 permit PC/XT application and system programs to be treated as "black box" object code modules which do not require any modification in order to achieve 80286 functionality. This is a crucial capability for the IBM PC/XT "80286 - retrofit" market.

The immediate effect of the IBM PC-AT announcement is to increase - not decrease - the demand for a truly compatible PC/XT 80286 upgrade. 80286-based work stations have overnight become the most sought after design!

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Bullet-286 Design Features

The fundamental issue of IBM PC/XT compatibility has already been considered. There are other aspects of the Bullet-286 product which are important and warrant further discussion. (Please refer to the large block diagram figure which accompanies this article.)

80286 CPU and 80287 NPX

The initial Bullet-286 product offering uses a 6 MHz 80286 CPU and optional 80287 Numeric Co-Processor Extension (NPX). The circuit design is capable of running at 8 MHz whenever Intel produces the faster parts. The 80286/80287 combination can be run in either real address mode (with the virtual machine emulation hardware and software enabled in order to maximize 8088/PC/XT compatibility) or in protected virtual mode (with the 8088/PC/XT emulation hardware disabled). The latter mode takes advantage of the more exotic features of the protected-mode 80286 and would be used, for instance, by a virtual-memory UNIX implementation.

Zero Wait State On-Board Dynamic RAM Memory

The Bullet-286 mother board can accommodate up to 1 megabyte of on-board RAM parity memory with zero wait states. The RAM chips can be populated on the mother board in one of four different combinations: 36 64K RAM chips (256K bytes total), 18 256K RAM chips (512K bytes total), 18256K and 18 64K RAM chips (640K bytes total), or 36 256K RAM chips (640K bytes user memory plus 384K bytes kernel and data cache memory, for a total of 1 megabyte). Printed circuit board mounting space is provided for 18 RAM chips; the 256K, 640K and 1 MB configurations require Ansley piggy-back sockets. The 6 MHz version of the Bullet-286 uses 150 nsec RAM's; the 8 MHz version requires 120 nsec devices.

Off-the-shelf PC/XT-compatible memory cards can be installed on the expansion bus, in order to extend the total amount of memory available beyond the on-board capacity (256K or 512K options). However, the 80286 must run several times slower when it accesses memory on the slow 8-bit expansion bus.

Virtual Bios EPROM

The Bullet-286 provides an on-board EPROM capacity of 16K, 32K, or 64K using two 2764, 27128, or 27256 devices. The EPROM data path is 16-bits wide with one wait

Continued on page 77

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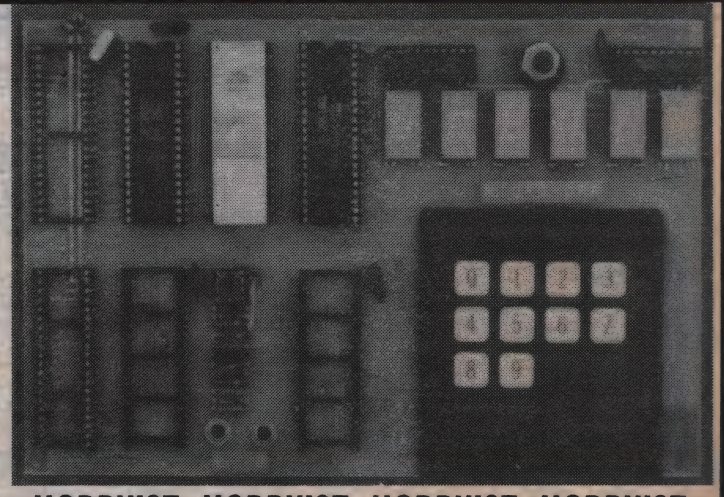

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Bullet-286
Continued from page 76

state (using 300 nsec devices). EPROM code execution is protected - if a "user mode" program (application or operating system) attempts to call or jump into the EPROM-resident BIOS, execution traps to a virtual machine routine that emulates the equivalent IBM PC/XT BIOS service. This "virtual bios" approach has the very attractive advantage of making it possible to provide a 100 percent IBM-compatible BIOS written in a high-level language (such as C), without having to be concerned about possible copyright violations of IBM-proprietary object code!

Kernel Memory and I/O Protection

In order to implement a reliable PC/XT emulation environment, the Bullet-286 virtual machine environment is hardware protected. Memory and I/O resources reserved for the privilege virtual machine "kernel" cannot be accessed by "user-mode" PC/XT programs. Memory and I/O device protection extends both to on-board and off-board (PC/XT expansion bus) resources. It is impossible for "user mode" programs (operating system and application software) running in the PC/XT emulation environment to clobber the underlying virtual machine emulator.

Virtual I/O Device Trap Logic

Non-existent or incompatible I/O devices can be trapped by the Bullet-286 and emulated in a totally transparent fashion without modifying existing PC/XT operating system software. For example, without modifying the PCDOS object code in any way, one can use the file server storage facilities provided over a local area network to emulate the XT 10 MB hard disk.

Semiconductor Disk Storage

The Bullet-286 has extended memory and hardware protection facilities which makes it possible to implement disk I/O buffering (LRU block caching and/or semiconductor disk emulation) that is built into the hidden virtual machine in a totally transparent fashion. No modification of PC/XT operting systems is required. Most PC/XT application programs are disk I/O bound - in order to really benefit from the faster execution speed of the 80286 CPU, disk I/O throughput must also be accelerated. The Bullet-286 provides very extensive RAM memory buffering in order to achieve this goal.

Summary

The Wave Mate Bullet-286 mother board provides the highest degree of IBM PC/XT compatibility available today using the high-performance 80286 microprocessor. It overcomes the crippling 8088 CPU bottleneck and introduces a whole new world of performance. The extensive on-board memory capacity makes it practical and economical to expedite disk I/O using large-scale buffering and semiconductor disk emulation techniques. Step up to AT-level performance quickly and painlessly. The Wave Mate Bullet-286 is available in four models; with 256K at $1,995, 512K at $2,395, 640K at $2,495 and 1 megabyte at $2,995.

For further information contact Wave Mate, Inc., Hawthorne, CA, 213-978-8600. ●

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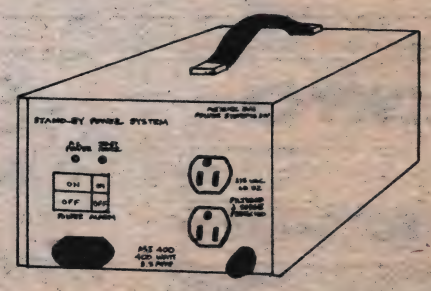

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Short Projects
Continued from page 62

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This will not however boost the level of the function SOUND. It is unfortunate but true SOUND is sent to both the speaker and to the edge connector. The announced (but never seen) TS2060 interface was to use the edge connector output. Alas!! we are left to our own devices, none of which offer us access to that BEEPing edge connector.

So, there you have it!! Three quick projects for your TS computers. ●

MacUniverse #3

by L.J. Kutten

Last month I told you about Copy II Mac. This program allowed you to back up protected disks and the like. Well, it seems the software developers have caught up with it. According to my sources, Copy II Mac cannot copy the following programs: Electric Checkbook, Forecast, MacPascal by Apple, MacZap, and Trivia Fever. I can understand the developer's desire to copy protect their program, yet at the same time why should the legitimate user be forced to pay each time a disk gets bombed. During January, I had two master diskettes die. I got a system error and the disk would not reboot. In both instances it cost me $10 to get a replacement "master" diskette.

I want to recommend a clip art disk for use with MacPaint. It is called Clip 1 and published by Frazier, Peper & Associates. It is like all the other clip art disks available except for one major exception; it comes with a 36 page manual that explains how to best use the art. For example, it told me how to overlap two pieces of art, a baby and a window frame so the baby was looking out the window.

Clip 1 contains over 200 pieces of art contained in 30 folders. The art includes pictures of wheeled vehicles, heads, bugs, birds, musicians, moon pictures, and Americana symbols. Clip 1 does not contain the traditional borders because they are too easy to create using the art already in the folders (they even give an example). However before you buy Clip 1 or for that matter any other Clip Art for the Macintosh make sure it contains art that is of some use to you.

For those of you who cannot spell, your Universe Master has found a spelling dictionary to help you. It is Hayden Speller and costs $79.95. It comes on a protected disk but backups are available for $10 and future updates will cost $5.00.

Hayden Speller works with both MacWrite and Microsoft WORD. To use it click the dictionary icon. Once the program starts merely tell it what file you want to proof. If you are not sure how to spell a word merely type in the first three letters and last two letters and the program will display words that fit your criteria. The main dictionary contains 20,000 words (overly small in my opinion) and you have the capability of creating your own supplemental dictionary. The program works extremely fast and is extremely easy to use. Once you have read the manual, you will not need it again. There is one warning in using Hayden Speller with Microsoft WORD; you must end the WORD file with a carriage return. Otherwise WORD creates a non-standard file which WORD will have trouble reading after Speller is done with it.

Rcently digitizers have burst upon the Macintosh scene. A digitizer is a device that will take a picture and transfer it into a computer readable picture. For the Macintosh there are currently two competing technologies. The first tech-

Continued on page 79

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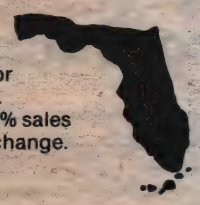

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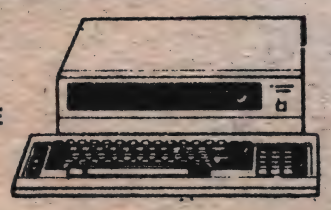

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MacUniverse #3
Continued from page 78

nology is called Thunderscan by Thunderware and cost $229. It uses the Imagewriter mechanics to scan a picture. You replace the Imagewriter ribbon with with Thunderscan device and roll your picture into the Imagewriter where it is scanned. The image is then reproduced at over 200 dots per inch in 32 shades of gray.

The second technology creates the image from a standard composite video signal from a video camera, VCR, laser disk, or even another computer. A number of companies put out this type of system. Costs start at $500 and up depending on whether a video camera is included.

If you have early Microsoft software and have not received a letter telling you updates are available, contact Microsoft's customer service and complain. The necessary notification will be sent to you. The number to call is 800-426-9400.

Recently I heard two problems that I feel deserve passing on. First if you have your 128K system upgraded to 512K, before you take it home, make sure it will access an external drive. One individual had to make three trips to the computer store to replace defective boards. Secondly, it appears that some Macintoshs are very sensitive to cold and heat. The Macintoshs stated operating range is between 59 and 95 degrees. Some people have reported that when the temperature is below or above by a few degrees their computers will not work. If you have a similar problem and the temperature is near one of the extremes, cool it down or warm it up before you take it in for repairs.

By now you all should have heard of Apple's laser printer. This printer has a Motorola 68000 processor (the same one that is in the Macintosh) and contains 1.5 MB RAM and a 512K ROM. Its printing speed is 10 seconds per page (6 copies per minute) and it can print anything that Macintosh can display on its video screen. It has an outstanding 300 dots per inch resolution (a typical print shop has 700 dots per inch).

This printer is not cheap. Besides a suggested retail price of $6995, it requires a $99 toner cartridge that will last 3000 copies. Excluding the capitalization cost of the printer, this means the average cost per page will be $03.3. This is quite high when compared to many daisy wheel and dot matrix printers.

Regardless of the cost many people expect the laser printer to quickly replace the daisy wheel and dot matrix printers. Well I for one do not think so. I can think of two things my Imagewriter printer can do that a laser cannot; (1) prepare envelopes and mailing labels; and (2) prepare carbon forms (this includes carbonless NCR forms) as they need impact to make the copy.

Speaking of Imagewriters, Apple has a new printer driver available. This driver supports the 15 inch Imagewriter. This was a necessity because of the

Continued on page 80

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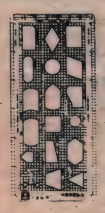

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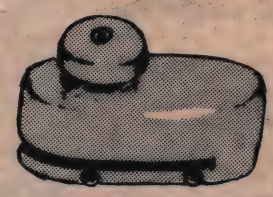

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MacUniverse #3

Continued from page 79

avalanche of database programs that are now available. There are times when you just need a 15 inch paper for a database.

This month I have two programs available to Compuserve to recommend. The first is a public domain RAM disk to use on a 512K Macintosh. It is called RAMDSK.HCX and allows you to use part of 512 RAM as a super fast disk drive.

The second program is called TXTPRT/BAS. It allows the printing of arbitrary text files. It is especially useful when the file is too big for MacWrite (I have used it to print out files exceeding 60K!) When printing out files, you have the following options: (1) four pitches, wide, pica, elite and condensed; (2) three line spacings, single, double or triple; (3) setting the top, bottom, left, and right margins; and (4) printing out on either continuous or cut sheet paper.

I have some more information to share with you about the Lotus' Jazz program. Read it and drool!

Jazz will support five functions; word processing, spreadsheet, database management, communications, and graphics.

The word processing function can display several documents at once. It has built-in mail merge capabilities, and in conjunction with its communications capabilities, can send and receive documents. Finally, besides using the mouse, many of the commands have keyboard equivalents.

Using the spreadsheet functions, you can open several spreadsheets at once and even a word processing document. The spreadsheet will support 8,192 rows by 256 columns. Math functions supported include calendar, financial, statistical, and logic.

The database will allow you to view records using forms. It will be able to sort on any field, use up to three sort fields, and mix ascending and descending sorts.

The graphics capabilities will support six different types of graphs from data in either the spreadsheet or database. Types of graphs and charts supported include pie charts, line graphs, bar graphs, area graphs, scatter graphs and percent graphs.

The communication function will support asynchronous communications which will allow the Macintosh to emulate a DEC VT-52 or VT-100 terminal. It comes with a utility program that allows transfer and conversion of data from 1-2-3, Symphony, and Multiplan.

Finally, before I go I have one serious piece of advice to pass along. Before you order any product, including products advertised in Computer Shopper, make sure they really exist. Many times products are advertised months before they are released (and some are never released). I know of people who paid for hardware and software in advance only to have to wait months before they received their order. If you are not sure the product actually exists, or do not know the company, either pay by credit card or C.O.D. With either form you will not have to pay until receipt of your order.

Products mentioned in this article:

Clip 1 — $29.95 + $2 shipping. Frazer, Peper & Associates, PO Box 3019, Santa Cruz, CA 95063. 408-476-2358.

Copy II Mac — $39.95. Central Point Software, 9700 S.W. Capitol Highway, Portland, OR 97219. 503-244-5782.

Hayden Speller — $79.95. Hayden Software, 600 Suffolk St., Lowell, MA 01854. 800-343-1218.

Microsoft. 10700 Northup Way, Bellevue, WA 98004. 800-426-9400.

ThunderScan — $229. Thunderware, 19G Orinda Way, Orinda, CA 94563. 415-254-6581. ●

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Ask The Guru

by Don Lancaster

Using MacPaint's "leaky lasso" trick, a new route to low cost robotics, stretching the short lines on Applewriter IIe, improving cassette reliability, and finding all those top secret Apple manuals.

Welcome to release 2.0 of our brand new **Computer Shopper** feature column. As before, I'll do what I can to find answers to reader hardware, software, or supply problems. Just give me a call or write per the address in the end box. Best calling times are 8-5 weekdays Mountain Standard Time. I'll send a free booklist and a special goodies list to you when you respond. And even more neat stuff if you are an Apple hacker.

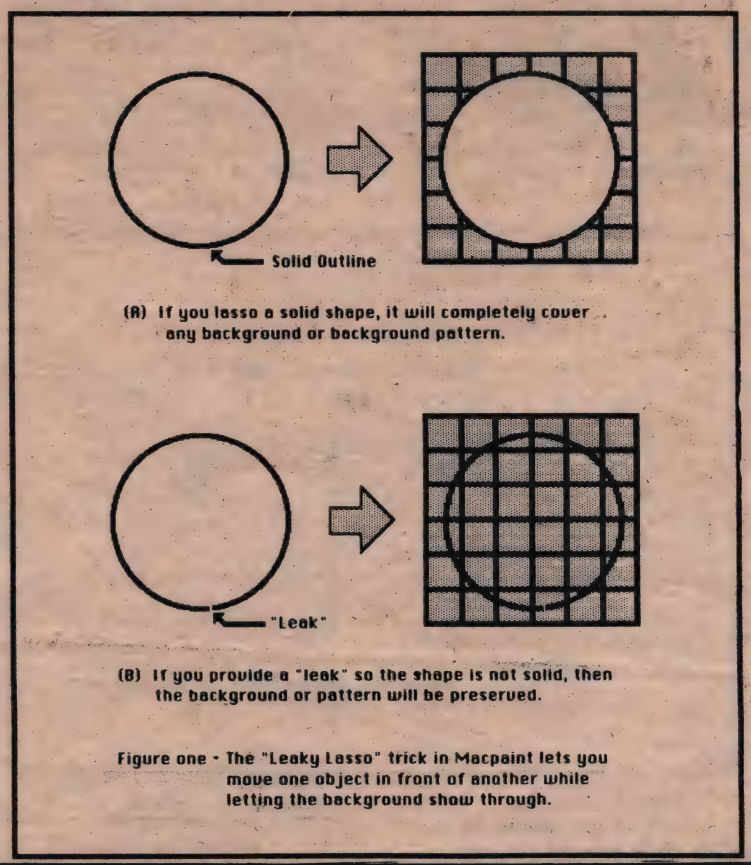
As before, we will gather all of the names and numbers together in a box at the end of the column. Note that some of these sources are very hard to pin down elsewhere, so be sure to save these listings.

Here goes...

What's MacPaint's "Leaky Lasso" Trick?

If you lasso a solid bordered object with MacPaint, that object will completely cover any background when it is moved. Sometimes, you might instead like to have the background "show through" any "holes" in the object you just lassoed.

Figure 2.1 shows us the solution. If you purposely put a "leak" in the border of what you want to lasso, the background will squeeze through the leak and appear where you want it to.



(A) If you lasso a solid shape, it will completely cover any background or background pattern.

(B) If you provide a "leak" so the shape is not solid, then the background or pattern will be preserved.

Figure one - The "Leaky Lasso" trick in Macpaint lets you move one object in front of another while letting the background show through.

In 2.1A, we have a solid circle. Lasso this and tow it over a background, and you get an all-white center. Instead, in 2.1B, there is a small leak intentionally added to the solid circle. Lasso this one, and the background shows through in the center.

The best way to make a leak is to use Fat Bits. The leak only has to be one pixel wide, no matter how big the inside area is.

When you are finished, you can plug up the leak, again by using Fat Bits.

One obvious use is towing a fancy border over already existing text. Chances are you'll quickly find lots of great new things you can do with this powerful leaky lasso technique.

Neat, huh?

Any Ideas on Low Cost Robotics?

It never ceases to amaze me that low-pressure pneumatics has never taken off. Yet, air pressure systems in the 3-to-6 psi range have enormous advantages.

First off, low pressue air is cheap and low tech. It gives you lots of linear force easy and simply. It can "amplify", since most of the "muscle" comes from the air source. This means you do not directly have to provide high-power electronic drivers as you do with solenoids or servo motors. Air also goes around corners beautifully, particularly robotic elbows.

Most important to us, low pressure air has fantastic hacker potential. You can literally beat one of these systems out on a brick in your back yard, and still come up with a promising and useful product.

You'll need an air source. The larger aquarium pumps are ideal, when combined with a small storage tank. Small tanks are easily built from plastic toilet tank floats. You can instead use a larger tank filled with a tire pump, or even use a scuba tank or a Scott Airpack bottle.

Hoses and connectors are no big deal. Get your hoses from Hygenic and the connectors from Value Plastics. A regulator is also usually need-

Continued on page 82

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Ask The Guru
Continued from page 81

ed. I've had the best luck running at 3.5 psi, although you get much more force up in the 5-7 psi range. You can get regulators for around six bucks from most of the surplus houses mentioned below.

Now for the fun part. You need a control valve. Unlike electricity or electronics, you cannot simply connect your air supply to an actuator to move it and then disconnect it to return. Try this and the air stays stuck in the pipe and the actuator will remain extended. Instead, you need **three-way** air valves that act like electronic SPDT switches. Powered, the air supply gets connected to the actuator. When the control signal is turned off, the pressure remaining in the actuator vents to ambient through the second arm of the valve.

You simply will not believe the price of an electronic three-way air valve for low pressure robotics. How does thirty cents sound?

Thirty cents!

They are called automotive EGR valves, and originally were made by Carter Carburetor. For many years now, they have been available surplus from **Jerryco, C&H Sales, Herbach and Rademan, BNF Sales, Surplus Center,** and all your usual mechanical surplus outfits. Your nearest handy dandy junkyard is also crammed full of them.

Incredibly, these have gone begging.

You'll find that Jerryco has far and away the lowest valve pricing, the most outrageous catalog, and the most mind-blowing array of other goodies. Where else under one roof can you get a real joystick for a B-17 bomber, lumber grading crayons, a matched set of 24 official US Army urine specimen bottles, candle molds, or a dummy howitzer shell? Check them out.

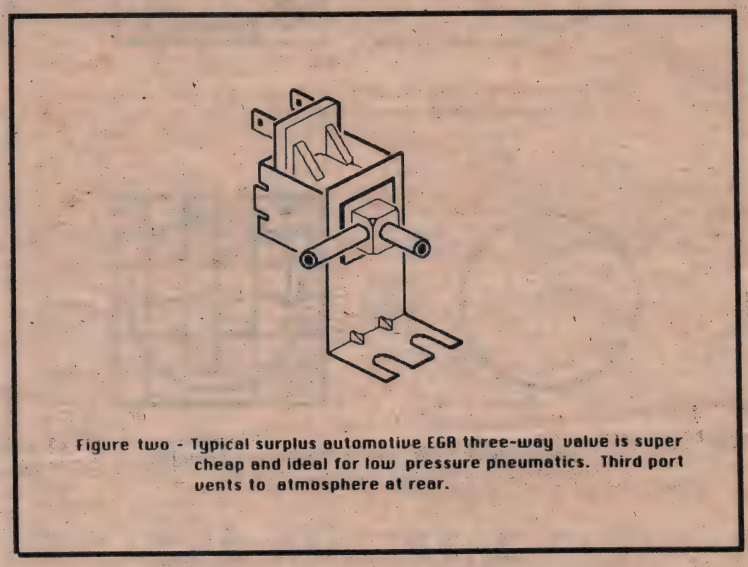

Figure two - Typical surplus automotive EGR three-way valve is super cheap and ideal for low pressure pneumatics. Third port vents to atmosphere at rear.

The valve is shown in figure 2.2. You power it with +12 volts DC to connect the air source to the load. Removing power vents the load to ambient through a filtered vent at the rear of the valve coil. The side pipe goes to the air source. You can make a simple manifold for several valves by taking a piece of thick, large diameter tubing and punching one pinhole in it for each valve. Then push the front arm of each valve into the pinhole. A push-on pressure seal is all you need at 3.5 psi. Medium power electronic drivers, such as a **Sprague** ULN-2813, easily power this valve under direct computer control.

What do you use for actuators? Traditional miniature air cylinders are available from **Clippard.** Unfortunately, they are also available at traditional prices. Instead, let's get non-traditional. There's a little known key secret to any useful low power, hacker based pneumatic actuator: **never** have a seal that must move! All of your low power air will either be wasted trying to move the seal, or else will leak right by it.

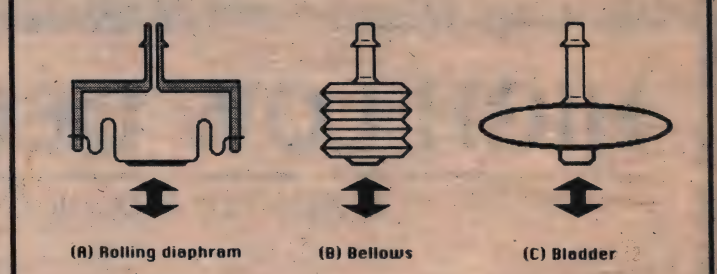

Figure three - Three low cost pneumatic actuators that avoid the "moving seal" problem.

Figure 2.3 shows us three different ways to build actuators that do not have moving seals. The rolling diaphram is available as a stock product from **Bellofram.**

I like the bellows actuators myself. I actually had a bunch of these blow molded long ago, to use in a pneumatic attachment that let you use a Selectric typewriter as a computer printer. It worked, more or less, but never became a viable product. Polypropylene is probably the best choice of material, although EVA or urethane might also be considered. Some scientific supply houses sell bellows pipettes that are almost useful as bellows actuators.

I've even ripped apart those "pump the water" toys that were available a few years back. The bellows pump inside these worked just fine. Chances are that you will prefer the "bladder" or "balloon" actuator instead, since these are the cheapest and are the simplest mechanically.

By the way, if you must have a seal anywhere at all, use an O-ring. These are far and away the best route, besides being reasonably cheap and standard.

Let me know what you come up with here. There's a fantastic opportunity going begging here. And you can be in on the ground floor.

Continued on page 84

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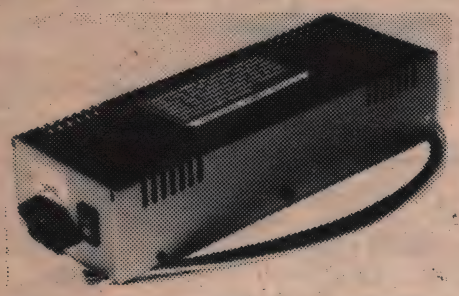

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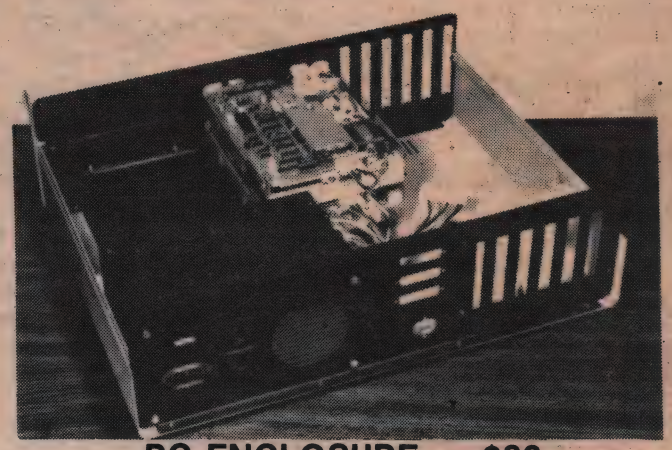

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Ask The Guru
Continued from page 82

How Can I Eliminate Applewriter "Shortlines?"

All versions of Applewriter have a nasty bug in their printer routines.

If you try to imbed printer commands in your text, the commands will get imbedded correctly and will get used correctly. Trouble is that they will also get counted as "real" characters, and will shorten any printed lines they appear in.

Listing 2.1 shows you a fix for either version of the **Applewriter IIe** program. You run this patch as an Applesloth program and then insert your third or higher backup copy when asked to. The shortline patch is then permanently installed on your third or higher backup copy.

Do NOT make this patch to either factory diskette! Use only your third or higher copy. One way to backup AWIIe is with **Copy II+** with a parameter change of 10:96.

After the patch is made, any imbedded sequence that consists of an escape followed by a single letter is perfectly repaired. Should you want to fix shortlines on longer commands or on non-escape imbeddings, just use an "[esc][esc]" to "bank" two characters, or an "[esc][esc][null]" to "bank" one character. Such banking is rarely needed.

This patch is available ready-to-run on my eight diskette side AWIIe toolkit as well.

An "alike but different somehow" STRETCHIFIER is needed for new ProDOS Applewriter 2.0. Write or call me for a copy.

How Can I Improve Cassette Tape Reliability?

Cassette tapes are still used on many smaller microcomputers, particularly orphans like the **Timex/Sinclair** or the **TI-99**. The cassette routines on Apple computers, while seldom used, remain the "save of last resort", either to recover from a blown DOS operating system, or to save any part of any program at any time for any reason.

Naturally, the best way to improve cassette tape reliability is to use a floppy disk instead.

Nonetheless, there is a very old, very simple, and little-known trick that can dramatically improve the reliability of most any cassette system.

If you could **quietly** listen to the tones as they are going into the computer, you can immediately tell any problems, level settings, noise, hum, or low battery hassles. You can also bypass starting clicks and pops.

This takes a ten cent modification to your tape recorder. The mod is shown in figure 2.4.

The trick is to alter the output jack so that the speaker is connected in series with a 330 ohm resistor (orange-orange-brown) whenever anything is plugged into the output jack. We have shown this jack as an "old fashioned" one to make the connections clearer. Regardless of its shape, when you inspect your output jack, you should find three leads.

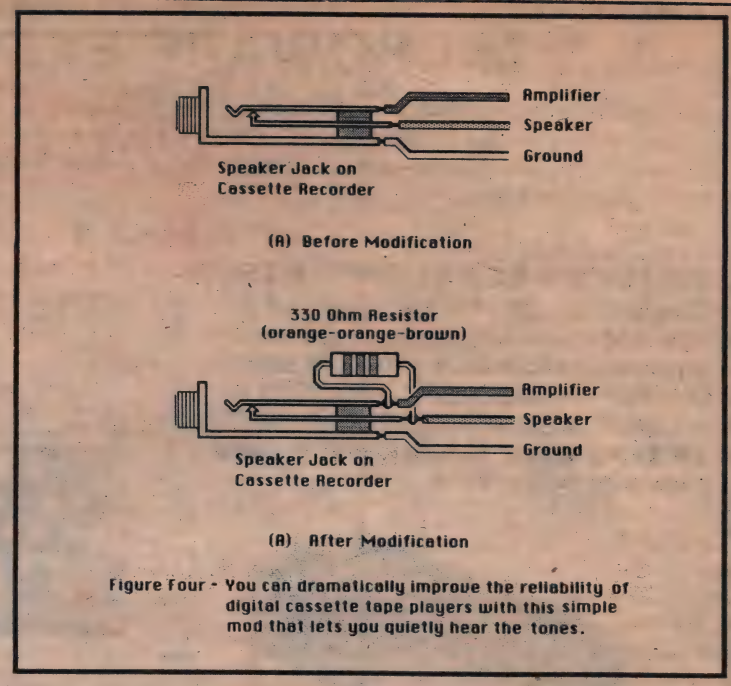

Figure Four - You can dramatically improve the reliability of digital cassette tape players with this simple mod that lets you quietly hear the tones.

One permanently goes to ground or a supply line. One permanently goes to the amplifier output stage. And one switchedly goes to the speaker. When something is plugged into the jack, that something ends up between the amplifier output and ground, while the speaker gets disconnected.

All you have to do is solder a resistor across the switch contacts that disconnect the speaker. If you are careful, you may not have to completely disassemble the recorder. If you can get down to where you see the solder side of the circuit board holding the output jack, you can often solder the new resistor on the foil side of the board, eliminating a need for a full disassembly. After soldering, make sure you can still plug an output jack in and out, and make sure that the case will still fit over the circuit board without stressing the board or the resistor.

How Do I Start My Own Tech Venture?

Funny you should ask that. For a mere $7.50 you can find out how I make money.

It's an underground classic I wrote a ways back called **The Incredible Secret Money Machine**, and it's still going strong. It's been in the Whole Earth top ten for a long time. Here you can learn all about the dangers of two crossed Granfallons, the black widow routine, the DOT technique, the CAP effect, the steam calliope fund, those all-important honchee guidelines, plus much more.

Hey, this stuff works. I've used it and thoroughly tested everything in it over and over again. Forever, it seems like.

Over and over again.

If you want to get in ahead of the hoarders, just use the help line. We have been known to take an order or two over the phone.

Where Do I Get Those Secret Apple Manuals?

See figure on page 87.

They weren't supposed to be secrets. Only a monumental

Continued on page 85

```
Listing 2.1  This AWIIE STRETCHIFIER Applesloth program modifies
             your Applewriter IIe backup diskettes to eliminate
             the short lines that result from imbedded printing
             commands involving escape sequences.

100  REM
110  REM **********************
120  REM *                    *
130  REM * "STRETCHIFIER"  FOR *
140  REM *                    *
150  REM *   APPLEWRITER IIe  *
160  REM *                    *
170  REM *     VERSION 1.0    *
180  REM *....................*
190  REM *                    *
200  REM *  COPYRIGHT 1984 BY *
210  REM *  DON LANCASTER AND *
220  REM *  SYNERGETICS,  BOX *
230  REM *  809, THATCHER AZ. *
240  REM * 85552. 602-428-4073*
250  REM *                    *
260  REM *   ALL  COMMERCIAL  *
270  REM *   RIGHTS RESERVED  *
280  REM *                    *
290  REM **********************

300  REM  This mod changes a
310  REM  backup copy of AWIIe
320  REM  so imbedded escape
330  REM  commands pass through
340  REM  the justify routines.

350  REM  This eliminates the
360  REM  "shortline" problem
370  REM  and lets you fully
380  REM  use a fancy printer.

390  REM
          ..................

400  TEXT : HOME : CLEAR
410  HIMEM: 8000
420  VTAB 1: HTAB 7:
       A$ = "Applewriter IIe STRETCHifier":
       GOSUB 980
430  PRINT : GOSUB 1030
440  PRINT
450  FOR N = 1 TO 39: PRINT  CHR$ (127);:
       GOSUB 1020: NEXT N
460  GOSUB 1030
470  VTAB 5: HTAB 1:
       A$ = "This program will patch Applewriter IIe":
       GOSUB 980: PRINT
480  VTAB 6: HTAB 1:
       A$ = "to eliminate the short lines created by":
       GOSUB 980
490  VTAB 7: HTAB 1:
       A$ = "imbedded printer escape sequences.":
       GOSUB 980
500 : GOSUB 1030
510  VTAB 10: HTAB 4:
       A$ = "Patch ONLY your THIRD BACKUP copy!":
       GOSUB 980
520  GOSUB 1030: GOSUB 1030
530  VTAB 14: HTAB 4:
       A$ = "Please put your THIRD BACKUP copy":
       GOSUB 980
540  VTAB 15: HTAB 4:
       A$ = "of AWIIe into Drive #1. Then push":
       GOSUB 980
550  GOSUB 1030
560  VTAB 17: HTAB 12:
       A$ = "<SPACE> to CONTINUE": GOSUB 980
570  VTAB 19: HTAB 19:A$ = "-or-": GOSUB 980
580  VTAB 21: HTAB 13:A$ = "<ESCAPE> to ABORT":
       GOSUB 980
590  VTAB 23: HTAB 19: PRINT "-< >-"
600  VTAB 23: HTAB 21: GET Z$
610  IF Z$ <  > " " THEN 970
620  REM
          Check Validity

630  PRINT
640  PRINT "[D]BLOAD OBJ.APWRT][E,A$2300
650  IF  PEEK (14720) <  > 235 THEN 950
660  IF  PEEK (17396) <  > 153 THEN 950
670  IF  PEEK (17436) <  > 252 THEN 950
680  PRINT "[D]BLOAD OBJ.APWRT][F,A$2300
690  IF  PEEK (15063) <  > 100 THEN 950
700  IF  PEEK (17771) <  > 153 THEN 950
710  IF  PEEK (17811) <  > 117 THEN 950
720  POKE 15062,96:  POKE 15063,153
730  POKE 15064,00:  POKE 15065,22:  POKE 15066,201:
       POKE 15067,155: POKE 15068,208: POKE 15069,04:
       POKE 15070,230: POKE 15071,211
740  POKE 15072,230: POKE 15073,211: POKE 15074,96:
       POKE 15075,196: POKE 15076,220: POKE 15077,240:
       POKE 15078,14: POKE 15079,185
750  POKE 15080,00: POKE 15081,22: POKE 15082,201:
       POKE 15083,155: POKE 15084,208: POKE 15085,04:
       POKE 15086,198: POKE 15087,211
760  POKE 15088,198: POKE 15089,211: POKE 15090,136:
       POKE 15091,208: POKE 15092,238: POKE 15093,76:
       POKE 15094,117: POKE 15095,71
770  POKE 17771,32: POKE 17772,215: POKE 17773,58
780  POKE 17810,76: POKE 17811,227: POKE 17812,58
785  IF PEEK (20365) = 176 THEN POKE 20365, 182:
       REM  RECONNECT HELP SCREENS
790  PRINT "[D]UNLOCK OBJ.APWRT][F"
800  PRINT "[D]BSAVE OBJ.APWRT][F,A$2300,L$30D3"
810  PRINT "[D]LOCK OBJ.APWRT][F"
820  PRINT "[D]BLOAD OBJ.APWRT][E,A$2300"
830  POKE 14719,96
840  POKE 14720,153: POKE 14721,00: POKE 14722,22:
       POKE 14723,201: POKE 14724,155: POKE 14725,208:
       POKE 14726,04: POKE 14727,230
850  POKE 14728,211: POKE 14729,230: POKE 14730,211:
       POKE 14731,96: POKE 14732,196: POKE 14733,220:
       POKE 14734,240: POKE 14735,14
860  POKE 14736,185: POKE 14737,00: POKE 14738,22:
       POKE 14739,201: POKE 14740,155: POKE 14741,208:
       POKE 14742,04: POKE 14743,198
870  POKE 14744,211: POKE 14745,198: POKE 14746,211:
       POKE 14747,136: POKE 14748,208: POKE 14749,238:
       POKE 14750,76: POKE 14751,252
880  POKE 14752,69
885  IF PEEK (19988) = 176 THEN POKE 19988, 182:
       REM  RECONNECT HELP SCREENS
890  POKE 17396,32: POKE 17397,128: POKE 17398,57
900  POKE 17435,76: POKE 17436,140: POKE 17437,57
910  PRINT "[D]UNLOCK OBJ.APWRT][E"
920  PRINT "[D]BSAVE OBJ.APWRT][E,A$2300,L$2F5A"
930  PRINT "[D]LOCK OBJ.APWRT][E"
940  TEXT : HOME :A$ = "IT WORKED!": GOSUB 980:
       PRINT : PRINT : PRINT : END
950  TEXT : HOME :
       A$ = "Will not verify as AWIIe; patch ABORTED":
       GOSUB 980: PRINT : PRINT : PRINT :
       PRINT : PRINT : END
960  GOTO 960
970  TEXT : HOME : CLEAR : END

980  REM
          Noisy screen machine

990  FOR N = 1 TO  LEN (A$): PRINT  MID$ (A$,N,1);
1000 GOSUB 1020: REM  Clickety clack
1010 NEXT N: RETURN
1020 ZZ =  PEEK (49200) +  PEEK (49200):
       FOR M = 1 TO 17: NEXT M: RETURN
1030 FOR N = 0 TO 700: NEXT N: RETURN

Gotchas:  Do NOT use this program on either "factory" diskette!
          Use only on your THIRD or higher backup copies!

          This patch gives an exact repair for two-character
          escape sequences.  For three-character imbedded
          sequences, "bank" characters by using [esc][esc] to
          bank two characters, or [esc][esc][@] to bank one
          character.  This also works for non-escape imbedded
          commands.

          In the above listing, [D] stands for "control-D". All
          other brackets are real.

          This program is avaiable ready-to-run from the Gila
          Valley Apple Growers Association voice helpline at
          (602) 428-4073 or through the address shown above.
```

< end Guru Listing 2.1 >

Ask The Guru
Continued from page 84

communications foulup made them that way.

You see, there is a "secret" manual for the IIc called, of all things, the **IIe Technical Reference Manual.** There is a similar "top-secret" manual pair for the IIe called the **IIc Reference Manuals.** And there is a humongous pair of "Q-level" security binders and dozens of support diskettes called **Inside Macintosh** and the **Macintosh Software Supplement.**

It is categorically impossible, repeat categorically impossible, to do ANYTHING useful on ANY newer Apple machine without these manuals.

Their pricing is not at all out of line with their contents. In fact, they are worth far more than the asking price.

Full details in Listing 2.2

So, what is the problem? Apple reasoned that if they came out with thorough, indispensible, and complete technical manuals that they really would not need full page **Wall Street Journal** ads to promote something so obviously good and so obviously needed.

Particularly if all of their machines are utterly and totally useless without these manuals.

In addition, since hackers would be beating the doors down of the dealers to get at these manuals, some onesie-twosie bookkeeping could be eliminated by asking those dealers to order the manuals in lots of five. Since the average dealer could easily sell a thousand of these a month if he wanted to, surely buying five wouldn't inconvenience anyone would it?

Well...

John Q. Hackerturkey walks into his Apple dealer and asks for a book the dealer never heard of. John, of course, does not know the exact name of the book, nor the part number. On his fifth trip, John finally convinces the dealer that the book really exists. The dealer finally checks, and sure enough. Surprise, surprise. And all the dealer has to do is send Apple a check for $150 to close a $50 sale.

Dealers have names for transactions like this, the nicest and least obscene of which is "negative cash flow". Strangely, they do not aggressively seek out such deals.

O.K. Here's how to get the manuals. First, politely but firmly go to a large Apple dealer with the exact part numbers and try and buy them. If you have a friend who is into sumo wrestling and frowns a lot, bring him along

Continued on page 86

WAREHOUSE DATA PRODUCTS

(Se Habla Español) **Call for programs not listed.**

Technical and Other Information (602) 246-2222
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Purchase an Okidata, Epson or Gemini Printer and receive at no charge a program to set print characteristics including expanded, compressed, correspondence quality, tabs, etc. In addition you can sell your old typewriter! This program will let you type one line from the computer keyboard, correct it, and then print the line when you hit the carriage return. Perfect to type an envelope or a short note, instead of bothering to load your word processor. We have this program on over 200 different computer formats, both CP/M and MSDOS. Retail value $35.

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Microsoft C Compiler	$299
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CBASIC CP/M-80	$95

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Prokey	$79
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5150 Keytronics Keyboard for IBM PC .. $115
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Hayes 1200 Modem	$429
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10 MB internal hard drive for IBM PC	$750
10 MB external drive 1 yr. warranty	$850
33 MB external drive 1 yr. warranty	$1595
IOmega Bernoulli 20 megabyte	$2595
Maynard Winchesters with Controllers	Call
Koala pad for IBM PC	$78
Koala speed key	$130
Memory-64K 150 Nanosec. (9) tested and guaranteed highest quality	$24
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BOARDS FOR THE IBM PC

Best Price in U.S. for IBM PC or Clones
Multifunction Board—Includes Async Adapter, Parallel Adapter, Clock with battery back-up and Software, 64K Memory Expandable to 512K. Optional Game Adapter Port and Second Serial Port.
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C.ITOH 55 and 25 CPS Printers	Call
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Corona Computer - Port. or Desk Top	Call

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3M Double side double density(10)	$23.95
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Final Close Out!!
Warehouse Data Products acquired a bankrupt wholesalers programs. We are offering the few remaining at giveaway prices!! Sale prices limited to stock on hand. All sales final.

APPLE II, IIE	LIST	SALE
DATADEX	150.00	40.00
FINAL ANALYSIS	100.00	35.00
IBM PC DOS 5¼		
DYNATECH CODEWRITER! SUPER AUTO-CODE GENERATOR	LIST 295.00	SALE 85.00
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SUPERCALC	195.00	50.00
TG TRACKBALL	64.95	20.00
VISISPELL	225.00	50.00
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CPM 86 8"		
SUPER SPELLGUARD	195.00	35.00
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EDIT TEXT EDITOR	120.00	40.00
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SOFTWARE DIM. A/R	595.00	140.00
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WORDSTAR V 3.3	495.00	125.00
WORDSTAR SPELLSTAR V 3.3	695.00	150.00
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CONDOR III DATABASE VERSION 2.1 List Price $695, **Our Price only $150.** Available for the following computers — MSDOS 8", CP/M 86 8", NEC CP/M-86 8", Superbrain.

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TOLL-FREE ORDER LINE 1-(800)-421-3135

WAREHOUSE DATA PRODUCTS
2701 West Glendale Ave., Suite 6
Phoenix, AZ 85021

Ask The Guru

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for effect. Renting a bengal tiger might also prove useful. If that does not work, try to group at least three, or preferably five, orders for the same manual at once. Do this with some friends or through your local school or club.

Note that borrowing one of these manuals will not work, since no one in their right mind would ever let one out of their sight for more than a few moments, if at all. Note also that the IIe and IIc manuals are normally ordered through dealers, while the Macintosh stuff must be ordered directly from the address shown.

Rumor has it that the McGraw Hill Bookstore is one mail order source that normally stocks and quickly ships the IIe and IIc manuals. There is another rumor that Addison Wesley will shortly republish the manuals as a stock bookstore item.

Go for it.

Names and Numbers

ADDISON-WESLEY PUBLISHING
General Books Division
Reading, MA 01867

(617) 994-3700

BELLOFRAM
30 Blanchard Road
Burlington, MA 01803

(617) 272-2100

BNF SALES
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Peabody, MA 01960

(617) 531-5774

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Pasadena, CA 91107

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St. Louis, MO 63132

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(503) 244-5782

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(602) 428-4073)

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Cupertino CA, 95014

(408) 973-4897

McGRAW HILL BOOKSTORE
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(212) 512-4100

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Worchester, MA 01247

(612) 853-5000

SURPLUS CENTER
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Lincoln, NB 68501

(402) 435-4366

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(602) 428-4073

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NEED HELP?

Phone or write your "Ask the Guru" questions and comments directly to

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Thatcher, AZ, 85552

(602) 428-4073

★ PRINTER RIBBONS ★

Golden Ribbon Corporation has been manufacturing and recycling printer ribbons for over four years. We consider ourselves to be among the best in the business as we pay particular attention to quality and service. Terms for delivery are COD, however, we do take Mastercard and Visa. **If you do not see your particular ribbon listed, please call us toll-free and ask us about it.** Recycling refers to respooling spooled ribbons with new, freshly inked nylon; reloading carbon ribbons with brand new spools of mylar; and reinking wideline ribbons.

RIBBONS	NEW		RECYCLED	
	1-11	12+	1-11	12+
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Data South DS180	5.25	4.75	3.25	3.00
Diablo HYII M/S	4.25	3.75	3.00	2.70
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NEC 5500 Spinwriter M/S	4.75	4.25	3.00	2.75
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Where can I get free tech magazines?

It never ceases to amaze me how many people have never heard of **controlled circulation** magazines. These are publications that are totally and absolutely free to a select group of insiders who enable the magazine to "qualify" for a special postage rate.

And, they are usually chock full of the latest and most needed information you are likely to see anywhere. Better still, most of them have bingo cards for immediate advertiser and product info requests.

I'd guess there's over 20,000

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Ask The Guru
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different titles of controlled circulation magazines available, and most of them are absolutely free.

Let's start with some electronic examples. *Electronic Design, EE Times, EDN, Electronic Products,* and *Digital Design* are first rate technical electroncis magazines. And there are dozens more.

Some mechanical magazines essential for robotics include *Machine Design* and *Design News*. Similarly, there are dozens of "old line" minicomputer journals, and lots of computer retail trade magazines.

Let me know if you want a more complete listing.

You "qualify" for any and all of these by requesting a qualification card and telling them exactly what they want to hear on the card.

Sometimes you can find current qualification cards ready to use. If not, a business letterhead is a must. Note that custom letterheads are free these days if you have any access at all to a Macintosh and MacPaint.

To date, nobody has ever been tarred and feathered for willfully and maliciously saying "that which is not so" on a subscription qualification card.

Creativity counts.

I personally subscribe to hundreds of these in wildly different fields. How do you find out what's available? Go to any library and they will have a *Bowker* book called *Uhrlichts Periodicals Dictionary*, which lists all of the magazines in the US or in the world, depending on the volume you pick. Those marked "controlled circulation" are most often free, and are certainly worth checking into.

Or, in a larger technical library, ask to see their public serials list. This is a pile of computer printout, a videodisk, or a stack of microfilche that tells you everything the library has in stock. They may call this listing by a different name. Get recent issues of target magazines, "liberate" the qualification card, and you are home free.

Incidentally, there is one sure fire way to get at least one free copy of any magazine, no matter how high the subscription price or issue cost. Just write the advertising department and request a sample issue and a rate card. On a letterhead, of course. Sometimes you will get several issues or even a free subscription out of one single request.

The following names and addresses are companies offering free magazines.

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Box 306
Half Moon Bay, CA 94019
408-996-1010

R.R. BOWKER
1180 Americas Avenue
Ny, Ny 10036
212-916-1600

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The "secret" Apple manuals

IIc Technical Reference Manual #A2L2005

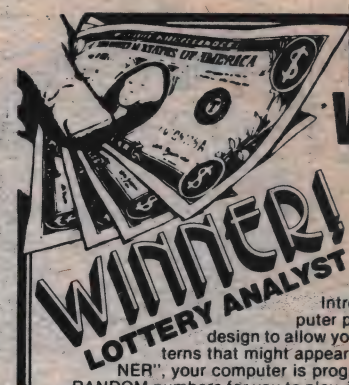
Two volume set essential for intelligent IIc use and operation. $50. Available from any Apple dealer, but only after you start kicking and screaming and throwing a temper tantrum.

IIe Technical Reference Manual #A2L4030

The same treatment given to the IIe in a single volume. $30 from any Apple dealer, but bring a Molotov Coctail and be prepared to fake an epileptic siezure.

Inside Macintosh and Supplement

Two enormous notebooks with all of the inside secrets of the Mac. $100. The supplement contains a dozen utility disks and an upgrade service. $100 extra. Available only from Macintosh Support, 10460 Bandly Drive, M/S 3-G, Cupertino CA, 95014.



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Let "WINNER" Computer Analyze The State Lotteries For You

"WINNER" Computer Analyst Programs available for the following states:
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Introducing ★**Winner I**, Lottery Analyst the computer program (heuristic simulation model) custom design to allow your home computer to detect any number patterns that might appear in state run "Lotto" like games. With "WINNER", your computer is programmed to use these patterns to pick NON-RANDOM numbers for you to play, improving your odds for winning! You get the "WINNERs' Edge" over random selection! "WINNER" The lottery analyst you need now!!!

★**Winner III**, Lottery Analyst ☆*NEW*☆ This software package allows the user to construct multiple simulation models that chose numbers independently. It will work for "Lottery-Type" games where the numbers 0-9 are drawn either 3, 4, 5 or 6 at a time.

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- Minimum System Required-16K
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DISK SERVICE MANUAL

Disk drives **MUST** be periodically cleaned and lubricated, and repaired as needed. Malfunctions can be devastating in lost programs, data and text; loss of business; upset customers; down time; uncertainty; unexpected high expenses. **YOU** can maintain, troubleshoot, and repair drives **WITHOUT EXPENSIVE OR DELICATE EQUIPMENT OR DIAGNOSTIC SOFTWARE** - often in situ and in less time than it takes you to remove, pack, ship, receive, unpack, install, re-configure, and retest drives sent to drive repair shops!! Shipping drives is risky! Self-sufficiency makes sense. If you want the job done right, with pride, on time, and at minimal expense - **DO-IT-YOURSELF!**

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New printer/typewriter cartridge ribbons are costly, and yet may produce less than 5 hours of quality copy! And are an inconvenience to order - **WHEN YOU CAN FIND THEM!** Now, you can re-ink your own cloth ribbons to last about 10 hours of quality use for about 50 cents and 10 minutes of effort per ribbon. Not any ink will do! We developed the right combination of clay-free ink and carrier - both commonly and inexpensively available from stores in black and 4 colors. Includes complete plans for your own el cheapo motor-driven re-inker. Completely described and illustrated. **STOP WASTING MONEY ON RIBBONS!! ONLY $6.**

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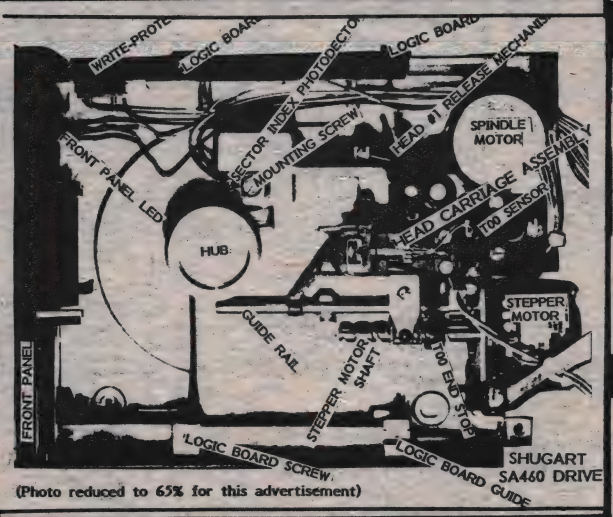

(Photo reduced to 65% for this advertisement)

PRINTER & PLOTTER MANUAL

Printers and plotters are costly, with little relationship between cost, quality and capability! **PRINTER & PLOTTER MANUAL** describes:

1) The physical specifications, features, and control codes of popular printers and plotters.

2) Printer and plotter interfacing, problem areas and how to correct them. Some are hard to interface. Most can be memory-upgraded to save **YOU** much time and expense.

3) Many cost-saving tips and recommendations in the purchase and operation of printers and plotters.

4) Circuit diagrams of **X-SWITCHERS.** Independently switch one/two printers or plotters to one/two computers without disconnecting either. Schematics of Centronics Parallel, RS-232C and 20 ma Current Loop.

5) Additional sections devoted to **PRINTER TYPES, PLOTTER TYPES, EXPANDING MEMORY, INTERFACING, ELECTRONIC TYPEWRITERS, RIBBON RE-INKING SECRETS, PAPER, PATCHING SOFTWARE, SPEED RATINGS, BUYING STRATEGY, and RS-232C PROTOCOLS.**

6) **BUFFERS, SPOOLERS, MEMORY UPGRADES, ELECTROGRAPHIC, TRACTOR-FEED, DIP AND PANEL SWITCHES, DOT-MATRIX, DAISYWHEEL, INK JET, LASER, FLAT-BED, ROLLER-BED, DRUM, WORDPROCESSING, DATAPROCESSING, CAD/CAM, TIME-OUT PROBLEM, GRAPHICS TABLET, CALLIGRAPHY, PS TYPESETTING, ADVERTISING, PUBLICATION LAYOUTS,**

7) Over 100 printer- and plotter- related terms defined, including abbreviations, control codes, and interface terms.

8) Cleaning, lubricating, maintaining, and repairing printers and plotters, with actual examples.

9) The names addresses of over 100 printer, plotter buffer, interface, and photo-imagery manufacturers.

Comprehensive and exhaustive - many illustrations and photographs - **ONLY $15.**

MUSIC TO YOUR EARS!! By John Williams, Electronics Engineer, former Computer Science professor, N.M.S.U. **WE PAY ALL U.S. SHIPPING!!** (10%, $3 min. foreign orders). Please allow 4-6 weeks for check-poid orders, else 3-4 weeks. **Dealers, Clubs and School Buyers welcomed - SUBSTANTIAL QUANTITY DISCOUNTS!! Custom editions for quantity orders! PLEASE ORDER TODAY! FREE CATALOG with order (else $1).**

COMPUTER PHREAKING!

According to the FBI, less than 5% of all **DISCOVERED** computer crimes result in conviction! Computer crime, or "Phreaking" costs $ Billions per year, and is clearly one of the most dangerous - yet most profitable and least risky - of all crimes! **COMPUTER PHREAKING** describes in detail:

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2) Numerous countermeasure, protection and security schemes - passwords to public key encryption methods. State-of-the-art techniques. Foil even the sharpest Phreaks!

3) Definitions of popular computer crime terms, including **PIRACY, TROJAN HORSE, LOGIC BOMB, TRAPDOOR, GODFATHER, MUTANT, ZOMBIE, BODY SNATCHER, SILENT ALARM, CHEESEBOX, CANDYMAN, CODE 10, etc.**

4) Thorough analysis of why computer crimes are the least risky and most profitable of all crimes.

Learn how to become a computer crime fighter! Comprehensive, illustrated, frank. **ONLY $15.**

THE "GOLDFINGER"

Finally, a metal detector that detects **PLATINUM, GOLD, SILVER and COPPER** objects and minerals, while rejecting all those made of iron or nickel (ferromagnetic)!! Virtually NO commercial metal detector can detect coins, jewelry and precious treasures, artifacts and ores because they are designed only to detect metals that can be lifted with a magnet (ex: rusty nails, bottle caps, car parts, and other useless iron junk).

The **GOLDFINGER** uses only two CMOS ICs (9-volt radio battery). All parts cost about $40, and are commonly available or easily made. Quiescent current is about 0.6 mA! Detection in soil is possible to greater than one foot.

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HomeWord 4-pac *Apple* 195.97 *C-64* 195.97
HomeWord 6-pac *Apple* 293.79 *C-64* 293.79
Screenwriter IIe *Apple* 90.97
SOFTWARE PUBLISHING
PFS Write *IBM* 87.50
PFS Write IIe, IIc *Apple* 79.50
SORCIM
SuperWriter *Apple* 206.50 *IBM* 206.50
STATE OF THE ART
Word Processing (II) *Apple* 276.50
STONEWARE
D.B. Master Business Writer *Apple* 104.30
TIMEWORKS
Word Writer *C-64* 34.97
TOTAL SOFTWARE
Total Text *C-64* 30.80
VISICORP
VisiOn Word *IBM* 262.50
Visiword Plus *IBM* 136.50

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ADVANCED LOGIC SYSTEMS
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Spell Handler *Apple* 41.97
The Handlers *Apple* 118.97
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Bankstreet Speller *Apple* 48.97
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Print Shop Refill *Apple* 10.47
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Mailing Disk *C-64* 28.00
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DELTA POINT
Business Letter Library *IBM* 69.97
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The Calendar *IBM* 34.97
The List Manager *IBM* 34.97
The Planner *IBM* 34.97
The Speller *IBM* 34.97
HES
Omni Writer/Spell/Multiplan *C-64* 97.97
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Easy Mailer *IBM* 175.00
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Speed Key *IBM* 13.97
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Planstar *IBM* 486.50
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Black's Law Dictionary *IBM* 175.00
List Manager (Apple II, IIe) *Apple* 175.00
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Sensible Speller *Apple* 87.50
Sensible Speller Pro DOS *Apple* 87.50
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Dic-tion-ary *Apple* 69.97
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Homeword Speller Bundle *C-64* 69.97
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PFS: Access (IIe, IIc) *Apple* 49.00 *IBM* 66.50
PFS: Proof *IBM* 66.50
SORCIM
Spellguard *Apple* 136.50 *IBM* 136.50
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Parallel Interface Card 69.97
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MSE 64K Ram Chips 200 NANO (set of 4) 39.95
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CP/M Gold Card (196K) 416.50
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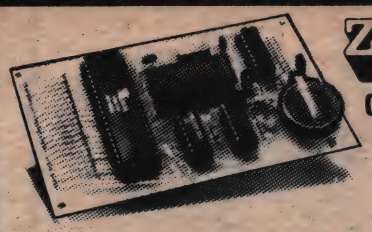

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Continued from page 87

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Where can I get an EPROM burned?

Any "old line" electronics distributor will be happy to program an EPROM for you. All it takes is $300, and either an exact working and debugged EPROM for them to copy, or else the code submitted on punched paper tape.

They will alternately accept your duodecimal code written in cuneiform on fired clay tablets. Provided, of course, that you sort them properly and then pack them with a 0.03 cubit spacing of papyrus reeds.

Arrgh. . .

Probably the cheapest local way of getting an EPROM burned is to check your nearest hacker club, or leave a message

Continued on page 91

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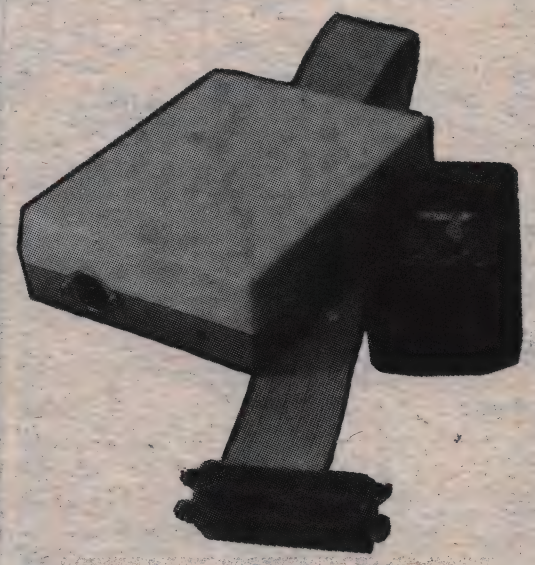

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Ask The Guru
Continued from page 90

on a regional electronic bulletin board. Fairly complete lists of most clubs and bulletin boards appear right here in Computer Shopper. Most clubs and bulletin boards have an up-to-date listing of all the others in your neighborhood, so find one, and you have found them all.

I know of only one hacker EPROM burning service, and it is an excellent one. It's called E-Tech Services out of Everett, WA, and they do good work.

For input, they want a hex image stored on a binary file on an Apple disk. Presumably they will eventually have a direct modem burn process, as well as a way to convert what's-their-name diskettes as well.

Cost is unbelievably low. Your EPROM or theirs. Yes, they can handle anything up to the 27128 (16K x 8) EPROM you need for Apple IIc monitor rework.

Can you do decent MacPaint isometric drawings?

An Isometric drawing is one that fakes 3-D by slanting the width and depth axes at 30 degrees. These are often used in technical illustrations where the relationships between working parts are very important.

Unfortunately, true isometric drawings will have ratty and unpleasant edges when you use MacPaint. This is caused by erratic groupings of pixels lines that are 30 degrees off-axis.

But we can get sneaky.

Instead of using isometric, use isomactric. Figure five shows details.

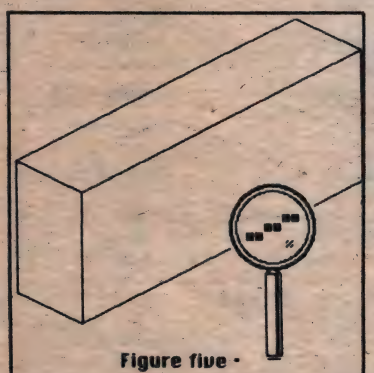

Figure five -

The secret to using isometric with MacPaint is to use isomactric instead. Make all slanty lines obey a "two over, one up" rule.

What you do is use angles of 26 degrees and 34 minutes instead of 30 degrees. This "magic" angle happens to be the angle whose tangent is 0.5.

Putting this gibberish into English, you simply go "two blocks over, one block up" forever on any slanty lines. The ratty look vanishes without a trace!

Figure five shows you how to handle isomactric drawing.

To get started, build yourself a couple of "perfect" slanty lines of two over and one up. Do one up to the left and one up to the right. Then clone these lines as often as needed for your drawing.

Ellipses can be a hassle. Try to keep as many circular openings on "top," where the ordinary ellipse generator in MacPaint can be used. For side ellipses, the axis is shifted significantly, so the stock MacPaint ellipses will look both awful and just plain wrong. Repeat the process twice, once for the "left" axis and once for the "right."

The solution here is to tape a giant isometric ellipse template onto your screen, and then trace the giant ellipses using fat bits. This should give you a complete set of "templates." Let me know if you are interested at all in a set of these.

Strictly speaking, isometric ellipses are a tad too fat for isomactric and the slanty dimensions should be forshortened slightly. In addition, very "boxy" subjects will appear out of proportion, so avoid them. These effects are easily adjusted for.

Thus, isomactric gives you a powerful new MacPaint capability. Send in some samples of what you can do with this intriguing new resource.

I Need A Simple Random Number Generator

First, note that there are two types of "random" numbers.

Continued on page 94

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Ask The Guru
Continued from page 91

Truly random numbers can assume any one of many equally likely values. Instead, pseudorandom numbers are the next number available in a contrived series that appears on the surface to be any one of many equally likely values.

There are computer uses for both types.

Unfortunately, this only gets you one random number, and your user may get tired of typing his name in every time you need a new number. A single random number can be most useful, though, as a "seed" to generate a sequence of pseudorandom numbers.

Generating pseudorandom numbers is not trivial. Applesloth tried it and failed miserably. As is well known, there is a fatal flaw in the Applesloth random number generator. Some of its contrived sequences can be acceptably long. Others are as short as 191 values before repeating. This leads to distinct "unrandomness" in many BASIC game programs. And, no, the published reseeding fixes don't help much—all they do is bury the problem and make it slightly more subtle.

Figure six shows a pseudorandom number generator that has no bad habits and easily passes the less exotic randomness tests. It is a model of a circular pipe with 2,147,483,687 marbles in it. The pipe has a one marble wide glass window in it. Half of the marbles are red and half are blue. The marbles sit in the pipe in an apparently haphazard order. By picking a random starting place in the pipe, you can get a random bit stream out. Take six bits for a random number up to 64. For a deck of cards, take out six bits, and only keep those whose values are in the range of 0-51, and so on.

To get the same sequence back, just start at the same entry point.

I've shown only the essentials in figure six, done so you can easily translate it to any machine language code of your choice. You could also use a higher level langauge if you are willing to accept pitifully slow execution speeds.

Four gotchas: You must never allow your pseudorandom word to contain all zeros or the randomizer will hang. You should "seed" the word with a truly random number for a new starting point and a new sequence. If you want an old sequence back again for a replay or "noise that repeats," just save the old seed somewhere and reuse it.

Thirdly, do not try using more or fewer words unless you know exactly what you are doing, for very long sequences are few and far between.

And a fourth possible gotcha: The individual bits you get on a single shift easily pass all sophisticated randomness tests. Believe it or not, though, certain combinations of sequential bits grouped into

Continued on page 100

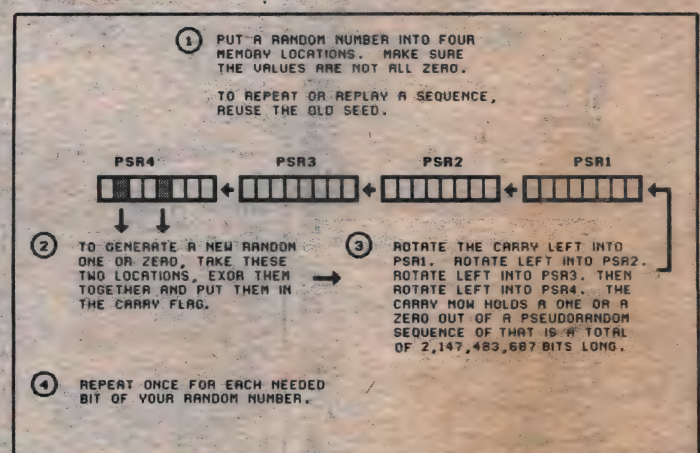

Figure 6 - Here's a fast and simple scheme for generating pseudorandom numbers. It works just fine for most real-world uses.

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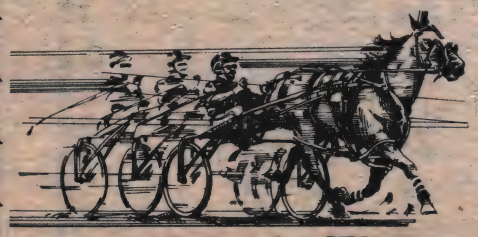
DOG RACES



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Digital Diagnostics For Floppy Disk Drives

by Dr. Timothy C. Prince

Floppy disk data storage made the difference which enabled the microcomputer to move from the hobbyist world into the business world. It remains the most practical backup data storage medium on computer systems which generate less than megabytes of new crucial data per day. It is an effective and inexpensive medium for transferring data to other computers across the room or on the other side of the world. For many of us it is the only permanent data storage medium, and we rely on it in a way those of us who have used large computer systems never could have imagined.

One factor which makes this possible is the identical positioning of the data on floppy disks recorded on various brands of hardware over periods of many years. The tolerances required are less than a tenth of a millimeter (about the thickness of the rotating disk) even for the most forgiving systems. If your drives are out of alignment when you record your valuable data, and later require servicing, you may never be able to recover the data. Those of us who regularly send disks to customers or friends find it embarrassing to send disks which their computer cannot be expected to interpret. We have ample reason to desire to keep our drives aligned.

The procedures followed in the past to check and adjust alignment required a skilled technician to remove the drive from its cabinet, hook it up to a specially programmed computer called an exerciser, employ a special alignment disk, and interpret patterns found by hooking an oscilloscope to various test points. Even the most important adjustments could be verified only on one track. The expense of these procedures often exceeds the cost of a new drive, and few of us could justify it as a precautionary measure. If the monetary value were not a problem, the disruption of operations would rule out such preventative maintenance.

In recent months, diagnostic disks have become available which facilitates the measurement of drive alignment without any special hardware or disconnection from the computer (1,2). Prudent periodic checks to verify this aspect of the integrity of your recorded data can be performed in a few minutes and the results recorded simply by turning on the printer. Any time the operating system reports disk data errors, the tests may be repeated immediately to determine whether the problem is in mechanical alignment. There is no longer any need to ignore the possibility of drive misalignment in the hope that it won't happen to you.

Why hasn't this solution received more publicity? Aside from the natural difficulty of recognizing new concepts, there are practical reasons. Few hardware manufacturers or dealers are likely to admit the advisability of periodic checks on the proper operation of their "friendly" equipment. The present pricing of the options which we are about to discuss does not offer sufficient return for software dealers who need 40 to 60% discount from retail to afford the marketing costs and technical support. It is up to the individual in this, as in so many other cases, to dig for the information which he or she needs.

Two of th emajor disk media manufacturers now sell specially recorded diagnostic disks. Verbatim's Disk Drive Analyzer for Apple II and IBM PC is reasonably priced but gives little quantitative information. The remainder of this article will discuss the use of Dysan's Digital Diagnostic Diskette.

The disks are formatted and recorded with precisely controlled misalignments on certain test tracks, and the unused regions unformatted and totally erased. By running a program which determines which sectors your computer system can read accurately, the tolerance for misalignment can be deduced. If the drive is correctly aligned, it should show a large tolerance for misalignment in either direction. Readers interested in a full technical discussion of these test disks should obtain Amelang's article(1).

Diagnostic disks are available for 5 and 8 inch drives with the standard track locations (both 48 and 96 tracks/inch for 5") and standard speeds (300 RPM for 5" or 360 RPM for 8"). In each case single or double sided and single or double density are offered. Double sided 8" disks have the special double sided index hole position. All 8" disks have 26 sectors per track, and 5" have 16 sectors per track. The only corresponding format commonly used by microcomputer operating systems is the 8" single side single density. Under the CP/M operating systems, these formats may be incorporated as options in the BIOS, but it is not often done as these short sectors sacrifice data storage space. The diagnostic disks use the short sectors to permit a wider range and finer gradation of measurement.

If your operating system accommodates the sector size of the diagnostic disk, you should be able by one means or another to determine which

Continued on page 97

```
A>DRVLINR

                    BIOS entry point: E203
Reading DRVLINR.CFG
CPU Clock  3.6000 Mhz
Controller Base Port: 00F8 Hexadecimal 248 Decimal
     Density sensing systems require
standard 1 sided disk in drive before selection.

      Which Drive has the Diagnostic Disk - A..P ?A

      BIOS DPH at FBFC  DPB at E691

            Disk A has  26 records per track and
       assumed to have  2 records per pair of sectors.

      Take normal Abort or Ignore exit from BIOS if asked!

            Dysan Diagnostic Command

          R = Radial       A = Azimuth

          C = Centering    S = Spindle Speed

          D = Drive Select E = Exit Program

          T = All Tests

Selection ?T

               Selected Track 35

              Diskette Centering Check

              Centering OK

               Selected Track 44

              Diskette Centering Check

              Centering OK

               Selected Track 47

              Diskette Centering Check

              Centering OK

              Azimuth Alignment Check
     Side 1:  -42  +42 Minutes Readable Misalignment

               Selected Track  0

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

               Selected Track  3

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

               Selected Track 38

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

               Selected Track 41

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

               Selected Track 70

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

               Selected Track 73

              Radial Alignment Check

        Radial Misalignment Tolerance Band, Side 1

    |-------------------------------------------|
-13 12 10 9 8 7 6 5 4 3 2 -1  1 2 3 4 5 6 7 8 9 10 12 13
   Away                              Spindle (.001 Inch)

            Dysan Diagnostic Command

          R = Radial       A = Azimuth

          C = Centering    S = Spindle Speed

          D = Drive Select E = Exit Program

          T = All Tests

Selection ?E
```

Digital Diagnostics
Continued from page 96

sectors can be read and thus the most important alignment parameters. The operating system won't like the disk with its lack of directory, totally missing tracks, and intentionally unreadable sectors. It can be accommodated by logging in a normally formatted disk of the same sector length and density and swapping in the alignment disk without letting the system know. Certain systems have coded into ROM the requirement for identification bytes on track zero, and cannot read track zero of an alignment disk other than single side single density.

Practical use of the diagnostic disks requires a special program. Most of the programs in the public domain and on the market are written for specific hardware configurations and use the operating system only as a means for starting the program or possibly in dealing with keyboard and screen. Operating systems such as CP/M which have standard disk driver software interfaces permit such programs to be constructed without hardware dependence, at least for 8" drives, and written in a high level programming language.

All programs based on the Dysan disk perform tests of the position of the read/write head relative to the standard track centerline indirectly by the misalignment tolerance method described above. These radial alignment tests determine whether the head is positioned on or between the proper track locations. All disk drives have a radial alignment adjustment. Few double sided drives have an independent back side adjustment, and single sided testing and alignment is sufficient.

Armed with the manufacturer's service manual and the willingness to take the risk, the individual now can tinker with this most important adjustment. Most business people will find it more satisfactory to get professional service, but now they have the advantage of knowing which drive needs adjustment and being able to check the results. The competent serviceman still will earn his or her keep, but won't be spending time on adjustments which the customer doesn't need.

The programs for the Dysan disks also perform an azimuth alignment test which determines whether the head is square to the track. Many drives have an adjustment for this which should be checked after the radial adjustments are made. Maladjustment here would lead to problems separating one data bit from the next.

A drive speed test should be included in such a program. This is not a function of the diagnostic disk; it can be done with any disk on a computer which has a Western Digital disk controller (1771, 1791, 1793 series chip) which is connected directly to a port of the main microprocessor. Timing can be done against a real time clock or against the CPU clock rate, if it is known accurately. This test will uncover problems such as a slipping belt. Many drives have a speed adjustment, and if this is wrong, the effective data density which the drive can read or write is wrong. NEC controller chips,

Continued on page 100

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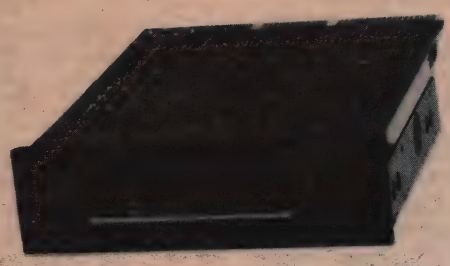

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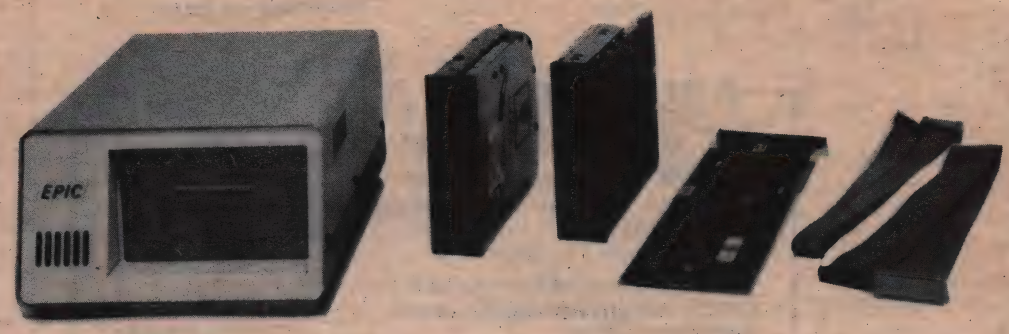

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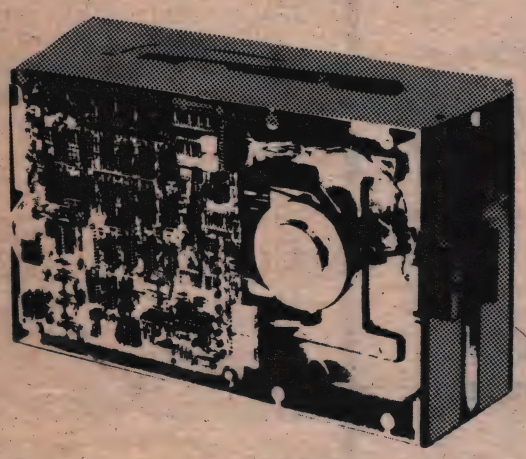

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Ask The Guru
Continued from page 94

words can sometimes fail certain very exotic tests.

Chances are that you are interested in the real world. There is a quick, simple, and devastatingly effective randomness test that Applesloth and many other so called "random" functions fail miserably.

All you do is plot the dots on a graphics screen, such as Apple's HIRES page one. If the screen "sticks" (as it will with Applesloth), you have a short and useless random sequence. If there is ever any shading, lines, unexpected patterns, etc., then you have blatently preferential numbers. This test uses your eyeball as an optical correlator that will pull subtle randomness failures right out of the woodwork.

Which should say that using groups of bits as a random word will be useful and effective for most real world needs. Note that this method is very fast and very simple to do.

If you really want to get into some gory details of why this generator works, check into Knuth's *Seminumerical Algorithms*, pages 1-160 (Addison Wesley). Or, if you want to go completely off the deep end, check into E.J. Watson's listing in *Mathematical Computing* 16 (1962), 368-369.

Many more details on figure six appear in my *Assembly Cookbook for the Apple II/IIe* (SAMS) #22331, including 6502 source code under EDASM and ready-to-run object code, along with links for BASIC, the screen plot test, a card shuffling demo, user examples, etc. It's also available on disk.

As another and separate use, you can route the generator to a speaker to generate a hissing white noise that really sounds awful.

Show us the sneakiest use you can come up with for these pseudorandom sequences.

That just about wraps our alpha cut of this new column. Let me hear from you. ●

Digital Diagnostics
Continued from page 97

used in many microcomputers, do not make the drive index pulse available. Speed timing in software is not likely to be possible on such computers.

Drive speed tolerances are usually quoted at about 2%, but the longer sectors usually employed in real operating systems may be more critical. Overspeed could prevent successful formatting of disks in formats which have little extra space at the end of the track, as with the Digital Equipment Rainbow format. Several manufacturers have set their drives intentionally slow to ensure ability to format more sectors per track, and to frustrate customers trying to interchange data with their competitors' equipment. In certain cases, it has been possible to realign the drives to standard speed, after taking precautions to keep old data available.

The Dysan Interrogator and Bromley Engineering BEDDISK programs for the Zenith H/Z 100 computer also perform an index timing test, which determines whether the optical sensor is properly located on the drive to sense the index hole at the proper time. This test requires the use of a Western Digital controller chip and a real time clock with 10 microsecond resolution. Real time clocks which simply count power line cycles like a digital clock won't do it. Proper index timing may be critical when using hard sectored disks (no longer common) or when formatting high capacity disks to be read on drives with NEC disk controller chips, such as Digital Equipment microcomputers. Not all drives have such an adjustment.

The Dysan Interrogator program is advertised for H/Z 100 computers with 5 or 8" drives, and for standard IBM PCs. Whether it will work on PC compatibles is unknown. Dysan local offices sell at retail.

Bromley's BEDDISK program runs on the H/Z 100 but appears to be intended for drive service shops. As the H/Z 100 (possibly with minor modification) is compatible with a wide variety of drives, it can be used to align drives removed from most popular computers.

Sheepshead Software advertises programs for the Kaypro computers, complete with service manuals and adjustment instructions.

Chandler Software's DriveLiner program runs on all CP/M 2.2 and 3.1 systems which support 8" drives correctly, since they must read single density single side disks. Drive speed tests require a Western Digital controller. The same program will test double sided disks if (as is not usual) the BIOS (the part of the operating system which is supplied by the hardware manufacturer) supports the 26 physical sector format. The 5" drive versions require BIOS support of the 16 sector format or customization for systems for which the disk driver source code is available. The DriveLiner program takes advantage of the unique CP/M provision of the disk device driver in operating system calls.

The accompanying listing shows a typical run through DriveLiner on a Radio Shack Model II computer with Pickles & Trout CP/M. The program reads 3 hardware-dependent parameters from a configuration file, and determines location of the BIOS Disk Parameter tables for its now use. The sense of the in-

Continued on page 101

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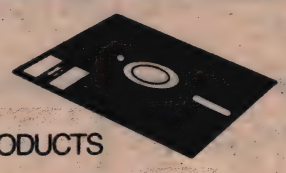

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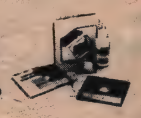

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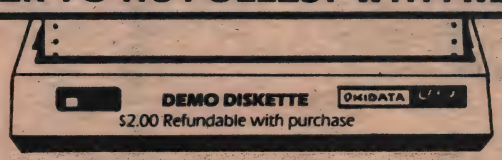

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Heath/Zenith

by Harold W. Bauman

Are You Using A Hard Disk?

While I write articles about Heath/Zenith for Computer Shopper, I thought that this subject was important enough to include under this heading even though it applies to most makes of computers. It is not a review, it is a how to solve a problem that can be serious to hard disk drive users!

I use both a Heath/Zenith Z-100 and a Z-100-PC computer in my business. The H/Z-100 has an internal 20 megabyte hard disk drive and the Z-100-PC has a 10 megabyte internal hard disk drive. These hard disk drives are a necessity for my business related applications involving large databases for accounting systems for many clients. I do not think that any hard drive users will argue that hard drives have the advantage of saving the user time. TIME in our business is money!

The BIG disadvantage plaguing the hard disk user is the necessary evil of the routine BACKUP of the hard disk files that is required if you are a responsible user. My H/Z-100 with the 20 megabyte drive is online with a MODEM all night, every night, seven days a week. My clients enter their updated files from their computers after they have closed the day's books. This transfers the responsibility of protecting their data to my organization.

This hard disk has been partitioned with two partitions. One of these is the MODEM partition. This protects the second partition data from the MODEM inputs and the security of that data in this second partition.

This MODEM partition has hundreds of files that are being updated daily. Thus, the operation requires that the MS-DOS BACKUP utility be used every morning to transfer these updated files to diskettes. This is necessary for a couple of reasons:

- Using and/or moving the update files could result in an operator error and loss and/or damage to the data files on the hard disk.
- The system could CRASH, including the hard disk and loss of all data!

The BACKUP procedure is a boring, time consuming operation that requires full time of the operator to sit at the computer and insert new diskettes as they are required. I use 80 track DSQD floppy disk drives with 640K storage capacity to speed up the procedure a little. This helps. There is still the need to provide good detailed labels on the diskettes and a good filing system so that the disks can be easily found if necessary. Also, there is the problem of a damaged floppy. Who has not damaged a disk or put a disk down without a label because of a disruption -- phone calls,

Continued on page 106

Digital Diagnostics
Continued from page 100

dex pulse is deduced so that drive speed may be determined. Centering tests check whether the disk is mounted eccentrically, an unlikely problem. Azimuth alignment passes the full range of misalignments on the disk. Radial alignment tests generate a tolerance ruler for each test track. For 48 track per inch disks, a tolerance of 0.008 inches each way is satisfactory and 0.010 is desirable. The average of the positive and negative tolerances indicates the track positioning error. A tolerance of +.013 −.009 would indicate a track positioning error of .002", which would be unacceptable because noise would be picked up from an adjacent track, causing read errors.

A small investment of time and money permits every operator of these computers to assure that the disk drives are in proper alignment and avoid the loss of valuable data. With a diagnostic disk program, verification of alignment becomes routine.

References

1. Amelang, L. "Dysan's Digital Diagnostic Diskette," Dr. Dobb's Journal, Dec. 1983 pp. 40-79.

2. Huber, T. "Heath Users' Group 3rd Annual International Conference," REMark Sept. 1984 p. 41.

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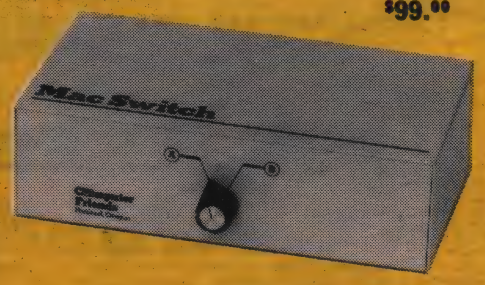

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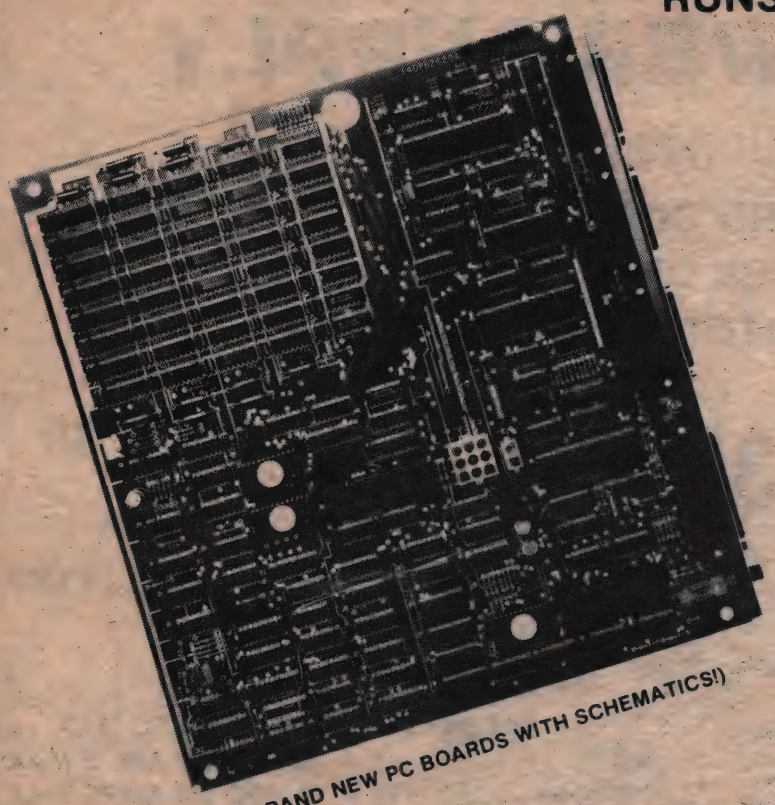

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We provide complete schematics, ROM'S, and parts lists. If you are an *EXPERIENCED* computer hacker, this board is for you! Remember, these are prime, unused PC boards! But since we have no control over the quality of parts used to populate the blank board, we must sell these boards as is, without warranty. You will have to do any debugging, if necessary, yourself!.

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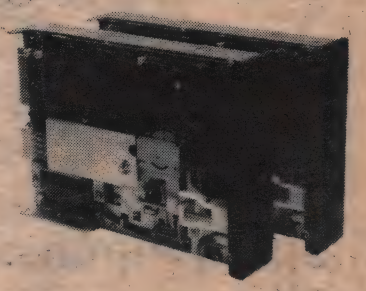
For IBM PC, TI PC, XEROX 820



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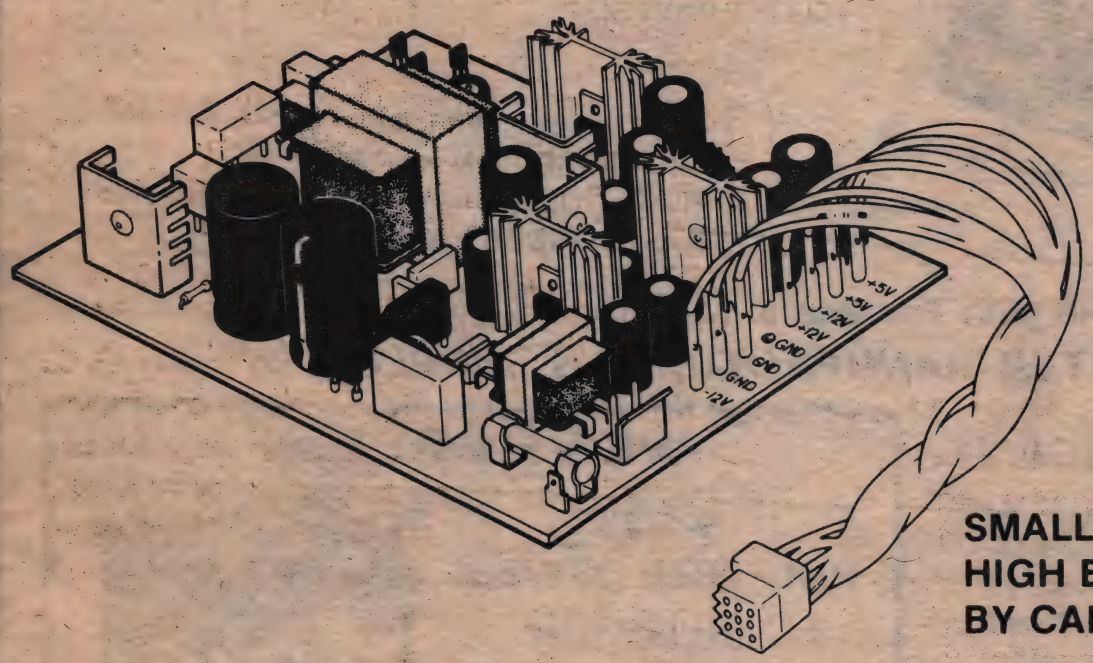

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HIGH EFFICIENCY SWITCHER MFG. BY CAL. DC IN *USA*!

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**MANUFACTURED IN JAPAN BY CANON.
THESE ARE PROBABLY THE MOST BEAUTIFUL
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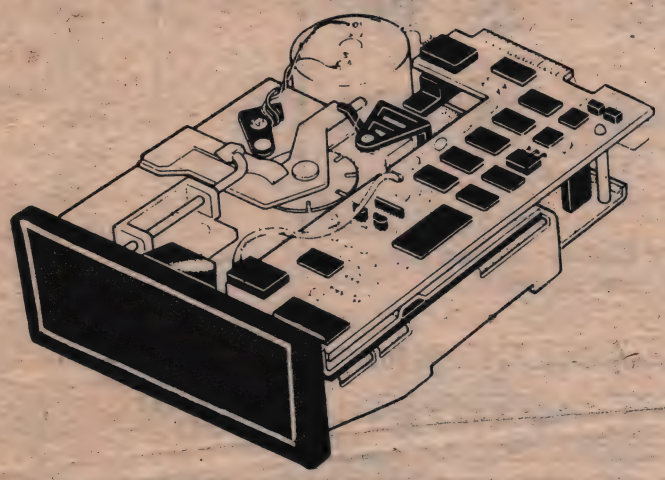

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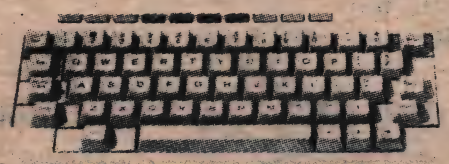
The same poor purchasing agent who nearly got lynched for over buying so many D.C. switchers has gotten carried away again. The Big Boss found another hiding place crammed with a truckload of the brand new precision manufactured 5¼" disk drives. Forutnately for us, the Big Boss remembered us from the switchers deal and he gave us an opportunity to make the "Second Best" surplus buy of the decade. Even though we bought a huge quantity, please order early to avoid disappointment. Please do not confuse these sleek, 2/3 height, high quality Japanese disk drives with the flimsy domestic units sold by others.

SERIAL ASCII KEYBOARD

$14.95 Each



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Maxi Switch 67 Key (includes 10 function keys) qwerty serial keyboard. Number KYBD2185010 keyboard which uses a CMOS 8048 single chip microprocessor for super low power consumption. Very high quality with an exceptionally smooth feel. Originally designed for use in a portable computer. Simple serial interface — complete documentation included — Size: 12" x 5½"

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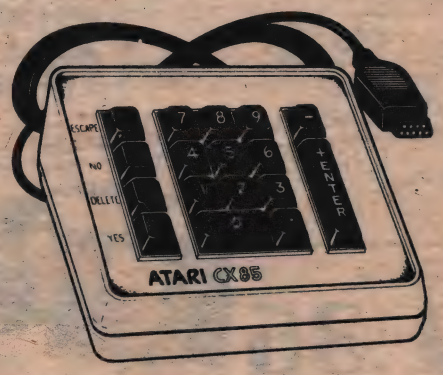

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Heath/Zenith
Continued from page 101

bathroom, etc.?

I studied the alternatives -- streaming tape and removable hard disks as viable substitutions for the floppy disks. The streamer tape method is still slow but it does relieve the operator from spending full time at the computer during backups. The streamer tapes are not all that reliable. They can easily be damaged with a little mishandling. They do not provide access to an individual file and the necessary labeling is a project in itself. Their main advantage is that the user can do other things during the backup procedure but that does not make them cost effective! The removable hard disk solve many of the problems but they are not all that reliable. The cartridge is not sealed so that the disk can become contaminated and the system is expensive. They also require a good labeling and filing procedure. SO, I procrastinated!

One Monday morning a few weeks ago, I sat down at the H/Z-100 to BACKUP the 20 megabyte hard disk. I had been away over Saturday and Sunday so I had a new box of diskettes along side the computer for a long, boring session of backing up a lot of updated files. As usual, I first requested a printout of the MODEM partition directory. What did I find? NOTHING! The hard disk had CRASHED! This had never happened to me before! What should I do! Did I loose both partitions? I checked and found it was gone too! I started to panic! At least I had complete BACKUP diskettes for the one partition and I had BACKUP diskettes for the MODEM partition from the previous Friday morning. I thought, do you know how long it will take me to RESTORE the complete hard disk with the two partitions. THEN, I realized that I did not have a hard disk with the necessary programs. The hard disk on the Z-100-PC is set up for different usage.

I decided that I had better start checking out what damage had been done. Fortunately, the H/Z-100 computer was OK! The problem was limited to the hard disk. I checked out what I could but did not find the problem. I proceeded to remove it from the computer so that I could examine it better. I still could not find the problem.

In the meantime I decided that I had to get setup some way to get my clients updated files before they might not be available. I programmed the dual DSQD floppy disk drives (640K each) to work with the MODEM to receive the files. I did not have the disk capacity for the automatic entry of each client's updates so I called each client and had them send the updates. Then, I changed the disk in the B: drive and called the next client and so on. BOY! Did I ever find out how dependent I was on the hard disk drive. Also, I was going to have to do this each day until I was set up with the hard disk again. This took my clients more time and it took a lot more of my

Continued on page 108

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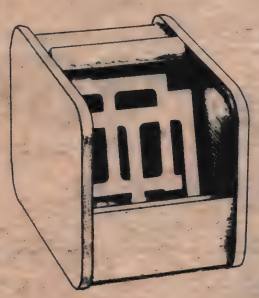
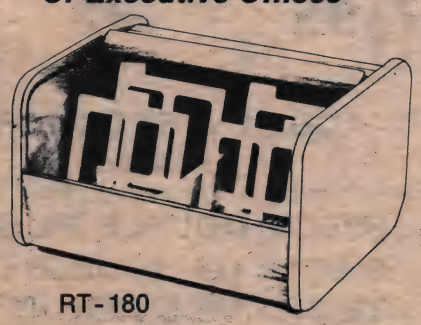


RT-90



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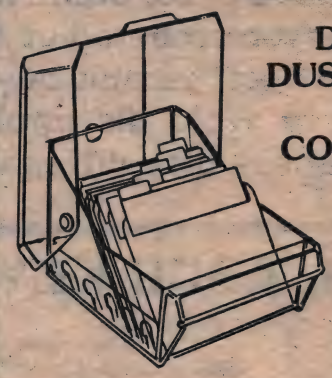

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We recently participated in a buyout of Shugart's finished goods inventory of these drives. Brand new in the original factory packing and guaranteed by us for 90 days. These 5 megabyte drives are considered by some to be the most reliable in the industry. These units directly replace a ST506 or similar drive.

When installing your system's first hard drive, a hard disk controller card and appropriate software are required. For an IBM-PC with a 50 or 60W power supply, you will need a 130W supply.

Performance Specifications

Formatted (33 sectors track)	
Per Drive	5.40 Mbytes
Per Surface	1.35 Mbytes
Per Track	8.45 kbytes
Per Sector	256 bytes
Transfer Rate	5.0 Mbits sec
Access Time	
Track to Track	16.2 msec
Average	99 msec
Maximum	215 msec
Average Latency	8.33 mesec
Start Up Time (Tvp)	12 sec

Functional Specifications

Cylinders	160
Tracks	640
R W Heads	4
Disks	2
Index	1

DC Voltage Requirements:
+12Vdc ± 5% 1.8 A typical (4.0A max. starting for 6 sec.)
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SURPLUS Tandon TM 55-2, 5¼", double sided, 48TPI 40 track, 6 msec. track to track* **$ 99.**

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NEW Remex ⅔ height with full height face plate, 48TPI, 40 track, double sided. May be used in place of TM 100-2* **$ 80.**

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NEW TEAC FD55B half height, 48TPI, 40 track, 6 msec., double sided. Power: +12V @ .25A typ., +5V @ .38A typ.* **$139.**

NEW TEAC FD55F, half height, 96TPI, 80 track, double sided **$169.**

NEW TEAC FD35F, 3½", 80 track, 135TPI, double sided **$195.**

NEW DTC Hard Disk Controllers for PC **$250.**

* All drives with asterisk are compatible with the IBM PC™ as 360K or 380K drives. Half height drives may required mounting brackets or filler plates not supplied with the drive.

All drives carry a 90-day guarantee.

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Upgade of 8 line to 16 line unit	$200.00
32K RAM Capsules	50.00
Thermal Paper	3.50
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Call for availability of 3½" and 5¼" drive expansion units.

A.C. Adaptors:

9VAC 150 ma	$ 2.00
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POWER SUPPLIES:

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ACDC OEM 5N17-1, 5V@17A, 10"x5"x5", 14lbs.	$45.00
Power Components C-611, 5V@10A, 13"x3"x4½, 9 lbs.	$25.00
Trygon LBS6-24-OV, 4.8-6.8V@24A, 6"x17"x8", 36 lbs.	$60.00
Tokin ST0510-S2, +5V@10A switcher 8½"x4¾"x1¾", 2 lbs.	$30.00
Sanyo 5V@6A Switcher 7½"x4"x1¾", 1 lb.	$25.00
Lambda LXS-CC-5-OV, 5@16A, 5"x5"x9.25", 15 lbs.	$45.00
Lambda LXS-D-5-OV, 5V@27.5A 7½"x7½x9¼", 22 lbs.	$60.00
Sorenson SSD5-30, 5V@30A swticher, 5¼"x3½"x10¼", 6 lbs.	$75.00
Sorenson SSD9-50, 9V@50A swticher, 7½"x5½"x12¼", 13 lbs.	$175.00
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Dacom 2489-01-C, 12.5V@1A unregulated 5"x5"x3", 2 lbs.	$10.00
ACDC 15N5-1, 15V@5A, 10"x4"x5", 6lbs.	$75.00
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Sorenson SLC20-5, 20V@ 5A, 5¼"x3½"x8½", 4 lbs.	$40.00
Sorenson SSD24-8.5, 24V@8.5A 5¼"x3½"x10", 5 lbs.	$90.00
Power General 3040-1, 5V@3A, 12V@2A cont, 4½A peak, switcher, 5"x3"x½"	$79.00
Astec AA11261, 5V@6A 28V@1A, unregulated switcher, 7½"x4½"x2"	$50.00
Compower 70040 +5V@3A, +12V@5A, −12V@.1A, 5"x10¼"x2"	$50.00
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				Z80A SIO/2			10.00
				280A CID			12.00
				Z80A DART			7.00

Heath/Zenith
Continued from page 106

time. I could not have an overnight automatic system that everyone had become use to.

To this day, I do not know what really happened to cause the hard disk to crash. I sent it out for repair and I was told that the heads had crashed into the disk surface in several areas which damaged the disk and all the heads. Both the disks and the heads had to be replaced. This took 11 days and $317.00 besides the inconvenience to my clients and myself. I vowed that I would NEVER let myself get into this situation again. BUT, what will I do to stop it?

Did I hear the readers ask when is he going to get to the point of the article? NOW! Only, I want to ask if any other readers ever had such a problem. I HOPE NOT!

I received the latest issue of Computer Shopper the day I was mulling this over and not thinking very clearly. I was paging through the issue as I usually do first to see what is in this issue. The answer HIT me from looking at several of the ads!

Why not use a second external hard disk drive for a backup? Computer Shopper advertisers have 5, 10, 15, and 20 megabyte hard disk drives (without controller boards, cables, software etc.) at prices from about $250 up to $600. External drive cabinets are available with power supply for single and dual drives at prices from about $40 to $150 with and without fans. The parts for the cables, such as, the ribbon wire, edge-connector, and female-sockets for the 20-pin and 34-pin sets run about $25. What will these parts do? Most, if not all, controller boards are designed to work with at least two hard disk drives. Therefore, a second external hard disk drive can be added with the above parts without using any additional computer power supply capacity and without using another computer board slot. This is important so that future expansion is still possible!

For the expenditure of about $350, it is possible to have an external 5 megabyte hard disk drive. For about $500, 10 megabytes is possible. What is the advantage?

If you will check your present internal hard disk drive, I believe you will find as I did only a limited portion of the files on the disk MUST be backed up. The bulky operating system and the application program(s) can be easily and quickly copied to another hard disk from your working copy diskettes. You will also find that many of the files are seldom used, or may never be needed any longer. At best, "archive" file copies might be needed and they could be put on diskettes and stored away with good labels. When you are through reviewing the files that you have, I think that the reader will find as I did that a 10 megabyte hard disk will have the capacity to backup the 20 megabyte drive. This does not mean that I am ready to give up the 20 megabyte internal drive because I am sure that I will soon be filling it up again until such time as I am forced to review what I have on it! BUT! I did conclude that for about $500 I could have the protection that I needed! I will be repaid the $500 in a few short months with the following time saving procedure (DO not forget time is money in this business!).

I used the H/Z-100 computer with the external drive the same way as I described at the beginning of this article. I leave the external hard disk drive turned off except when I am using it to do the backup of the client's updated files each morning. At this time. I turn on the external drive and copy the updates from the internal drive to a RAMdrive and from the RAMdrive to the external drive. I then turn the external drive off! Do you realize how fast this procedure is compared to the BACKUP utility with the changing of diskettes? I want to repeat, my time is money! Therefore, the repayment period is getting smaller everyday. Even more important, the only possible way I could have both hard disk drives crash at the same time would be a power company problem during the few minutes it takes for the backup procedure and even then with

Continued on page 128

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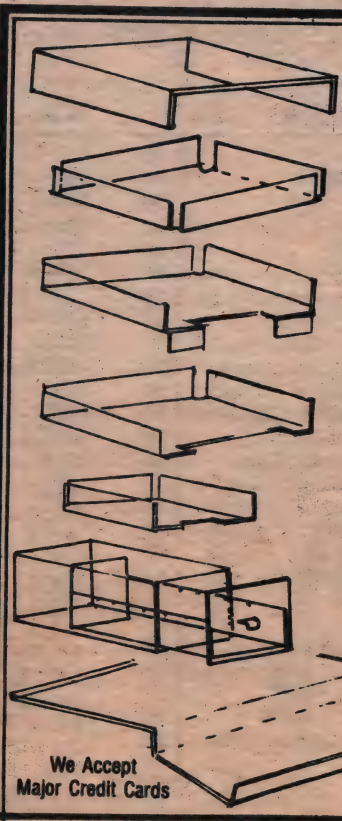

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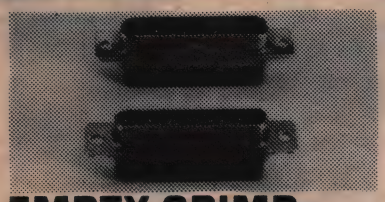

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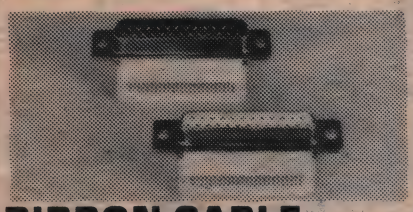

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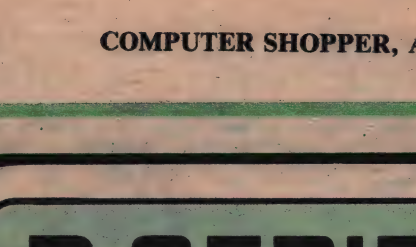
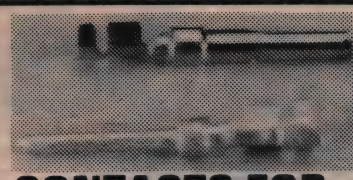
IDC-50P	19.71	18.40	17.25
IDC-50S	23.87	20.46	19.09



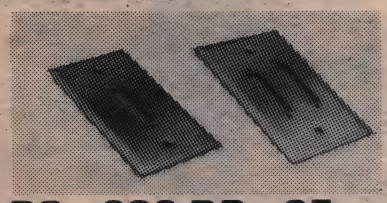
GRAY HOODS

PART #	PRICE/QTY 1-49	50-99	100-UP
GH-9	1.02	0.93	0.85
GH-15	1.04	0.95	0.87
GH-25	.95	2.16	1.92
GH-37	1.18	1.07	0.98
GH-50	1.32	1.20	1.10



CONTACTS FOR EMPTY CRIMP SHELLS

PART #	PRICE/QTY 1-99	100-999	1000-UP
CP20P	0.08	0.07	0.06
CP20S	0.10	0.09	0.08



RS—232 DB—25 WALL PLATES

metal wall plates

PART #	PRICE/QTY 1-24	25-49	50-UP
WP-1	2.95	2.66	2.36
WP-2	3.45	3.11	2.76

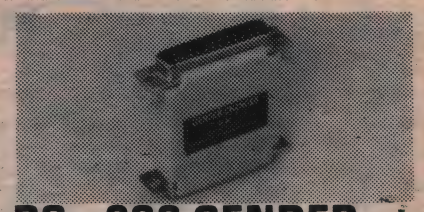
P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
P9P	1.58	1.44	1.32
P9S	2.60	2.36	2.17
P15P	2.10	1.91	1.75
P15S	3.66	3.33	3.05
P25P	2.90	2.64	2.42
P25S	4.38	3.98	3.65
P37P	4.30	3.91	3.58
P37S	8.18	7.44	6.82
P50P	5.50	5.00	4.58
P50S	10.70	9.73	8.92

CONTACT EXTRACTOR TOOL

extracts contacts from D crimp shells

PART #	PRICE/QTY PRICE
EX-1	2.75 EACH



RS—232 GENDER CHANGERS

PART #	PRICE/QTY 1-9	10-UP
AGC-M	9.95	7.95
AGC-F	9.95	7.95

P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
R9P	2.54	2.31	2.12
R9S	2.60	2.36	2.17
R15P	2.98	2.71	2.48
R15S	3.10	2.82	2.58
R25P	3.72	3.38	3.10
R25S	3.00	2.73	2.50
R37P	4.70	4.27	3.92
R37S	4.90	4.45	4.08
R50P	9.72	8.84	8.10
R50S	11.00	10.00	9.17

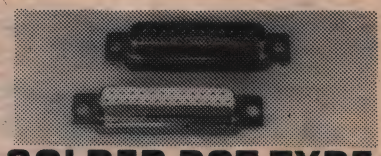
CRIMPING TOOL

for crimping D series contacts

PART #	PRICE/QTY PRICE
CT-1645	79.95 EACH

D-SERIES HARDWARE

PART #	PRICE/QTY 1-49	50-99	100-UP
MDH-1	0.55	0.45	0.35
FDH-1	0.85	0.75	0.65



SOLDER POT TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
9P	1.44	1.31	1.20
9S	1.94	1.76	1.62
15P	1.96	1.78	1.63
15S	2.60	2.36	2.17
DB-25P	1.85	1.60	1.45
DB-25S	2.10	1.85	1.65
37P	4.00	3.64	3.33
37S	5.20	4.73	4.33
50P	5.08	4.62	4.23
50S	7.80	7.09	6.50

BLACK AMP HOODS

PART #	PRICE/QTY 1-49	50-99	100-UP
AH—25	1.30	1.18	1.08

SOLDER POT TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
CEN-36P	4.00	3.64	3.33
CEN-36S	4.20	3.82	3.50
CEN-36SCM	3.50	3.18	2.92

RIBBON CABLE CRIMP ON

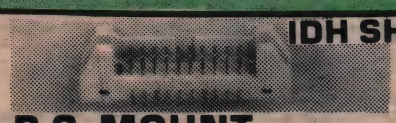
PART #	PRICE/QTY 1-49	50-99	100-UP
IDC-36P	6.00	5.45	5.00
IDC-36S	7.90	7.18	6.58

SHEILDED HOOD

PART #	PRICE/QTY 1-49	50-99	100-UP
SH-25	1.35	1.23	1.13

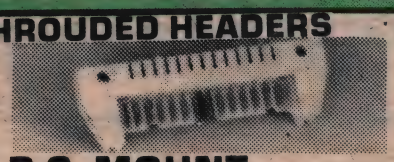
RIBBON CABLE CONNECTORS

IDH SHROUDED HEADERS



P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10R	0.80	0.72	0.64
IDH-20R	1.20	1.08	0.96
IDH-26R	1.50	1.35	1.20
IDH-34R	2.00	1.80	1.60
IDH-40R	2.40	2.16	1.92
IDH-50R	2.95	2.66	2.36
IDH-60R	3.86	3.47	3.09



P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10	0.80	0.72	0.64
IDH-20	1.15	1.04	0.92
IDH-26	1.50	1.35	1.20
IDH-34	1.95	1.76	1.56
IDH-40	2.30	2.07	1.84
IDH-50	2.85	2.57	2.28
IDH-60	3.45	3.11	2.76

.1 x .1 spacing, gold plated pins

IDH BREAKAWAY HEADER STRIPS

P.C. MOUNT STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10B	0.30	0.27	0.25
IDH-14B	0.42	0.38	0.35
IDH-16B	0.48	0.44	0.40
IDH-20B	0.60	0.55	0.50
IDH-26B	0.78	0.71	0.65
IDH-34B	1.02	0.93	0.85
IDH-40B	1.20	1.09	1.00
IDH-50B	1.50	1.36	1.25
IDH-60B	1.80	1.64	1.50
IDH-80B	2.40	2.18	2.00

P.C. MOUNT RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10BR	0.38	0.35	0.32
IDH-14BR	0.53	0.48	0.44
IDH-16BR	0.61	0.55	0.51
IDH-20BR	0.76	0.69	0.63
IDH-26BR	0.99	0.90	0.82
IDH-34BR	1.29	1.17	1.08
IDH-40BR	1.52	1.38	1.27
IDH-50BR	1.90	1.73	1.58
IDH-60BR	2.28	2.07	1.90
IDH-80BR	3.04	2.76	2.53

dual row .1 x .1 spacing, gold plated pins

ALTEX ELECTRONICS

RIBBON CABLE CRIMP ON CONNECTORS

IDS SOCKET TYPE

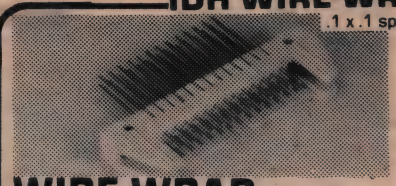
PART #	PRICE/QTY 1-49	50-99	100-UP
IDS-10	1.15	1.04	0.92
IDS-14	1.35	1.22	1.08
IDS-16	1.45	1.31	1.16
IDS-20	1.50	1.35	1.20
IDS-26	2.40	2.16	1.92
IDS-34	2.90	2.61	2.32
IDS-40	3.50	3.15	2.80
IDS-50	4.25	3.83	3.40
IDS-60	5.80	5.22	4.64

IDE EDGE CARD TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDE-10	1.90	1.71	1.52
IDE-14	2.00	1.80	1.60
IDE-20	2.25	2.03	1.80
IDE-26	2.65	2.39	2.12
IDE-34	2.95	2.66	2.36
IDE-40	3.50	3.15	2.80
IDE-50	4.25	3.83	3.40

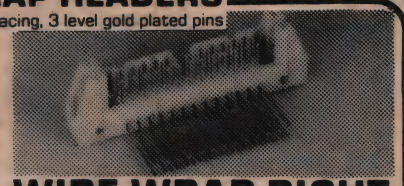
IDH WIRE WRAP HEADERS

.1 x .1 spacing, 3 level gold plated pins



WIRE WRAP STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10W	1.50	1.35	1.20
IDH-20W	2.55	2.30	2.04
IDH-26W	3.20	2.88	2.56
IDH-34W	3.75	3.38	3.00
IDH-40W	4.50	4.05	3.60
IDH-50W	5.50	4.95	4.40



WIRE WRAP RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10WR	2.45	2.21	1.96
IDH-20WR	2.60	2.34	2.08
IDH-26WR	3.25	2.93	2.60
IDH-34WR	3.80	3.42	3.04
IDH-40WR	4.65	4.19	3.72
IDH-50WR	5.55	5.00	4.44

IDP PLUG CONNECTOR

mates with IDS type connectors

PART #	PRICE/QTY 1-49	50-99	100-UP
IDP-20P	3.95	3.16	2.53
IDP-34P	4.95	3.96	3.17
IDP-50P	5.95	4.76	3.81

IDD DIP PLUG CONNECTOR

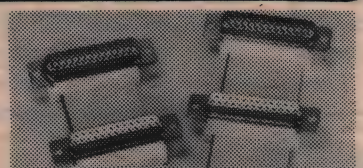
for pluging into IC sockets

PART #	PRICE/QTY 1-49	50-99	100-UP
IDD-14	1.30	1.17	1.05
IDD-16	1.65	1.49	1.34
IDD-24	2.25	2.03	1.82
IDD-40	3.90	3.51	3.16

RIBBON CABLE ASSEMBLYS

D-SERIES RIBBON CABLES

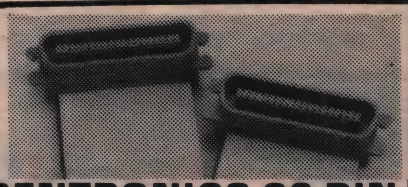
PART #	PRICE
9P-9P	8.00 + .18 per foot
9P-9S	8.28 + .18 per foot
9S-9S	8.56 + .18 per foot
15P-15P	9.72 + .30 per foot
15P-15S	10.10 + .30 per foot
15S-15S	10.48 + .30 per foot
25P-25P	10.50 + .50 per foot
25P-25S	11.10 + .50 per foot
25S-25S	11.30 + .50 per foot
37P-37P	16.44 + .74 per foot
37P-37S	16.95 + .74 per foot
37S-37S	17.80 + .74 per foot



GENDER MENDERS

PART # GM—25	PRICE
GM-25	22.50 + .50 per foot

25 pin RS-232 cable with a male and female connector on each end.

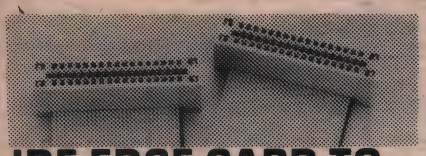


CENTRONICS 36 PIN RIBBON CABLES

PART #	PRICE
36P-36P	12.00 + .72 per foot
36P-36S	13.45 + .72 per foot
36S-36S	15.90 + .72 per foot

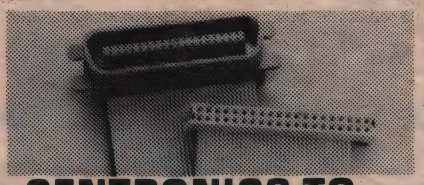
IDS SOCKET TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10S-10E	3.05 + .20 per foot
14S-14E	3.35 + .28 per foot
20S-20E	3.75 + .40 per foot
26S-26E	5.05 + .52 per foot
34S-34E	5.85 + .68 per foot
40S-40E	7.00 + .80 per foot
50S-50E	8.50 + 1.00 per foot



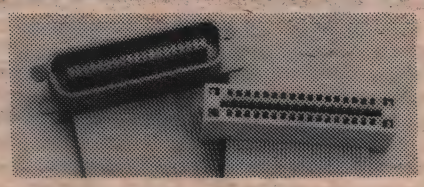
IDE EDGE CARD TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10E-10E	3.80 + .20 per foot
14E-14E	4.00 + .28 per foot
20E-20E	4.50 + .40 per foot
26E-26E	5.30 + .52 per foot
34E-34E	5.90 + .68 per foot
40E-40E	7.00 + .80 per foot
50E-50E	8.50 + 1.00 per foot



CENTRONICS TO IDS-40 RIBBON CABLES

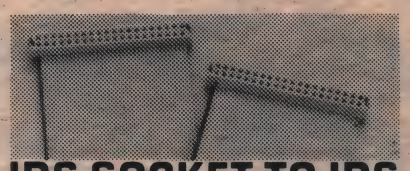
PART #	PRICE
36P-40S	9.50 + .72 per foot



CENTRONICS TO IDE-34 RIBBON CABLES

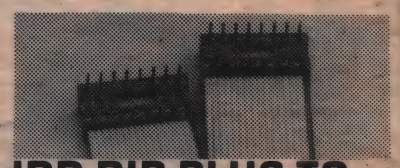
printer cable for TRS-80 computers

PART #	PRICE
36P-34E	10.25 + .68 per foot



IDS SOCKET TO IDS SOCKET RIBBON CABLES

PART #	PRICE
10S-10S	2.30 + .20 per foot
14S-14S	2.70 + .28 per foot
16S-16S	2.90 + .32 per foot
20S-20S	3.00 + .40 per foot
26S-26S	4.80 + .52 per foot
34S-34S	5.80 + .68 per foot
40S-40S	7.00 + .80 per foot
50S-50S	8.50 + 1.00 per foot
60S-60S	11.60 + 1.20 per foot



IDD DIP PLUG TO IDD DIP PLUG RIBBON CABLES

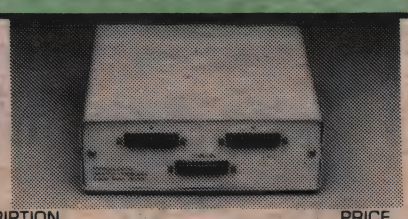
PART #	PRICE
14D-14D	2.60 + .28 per foot
16D-16D	3.30 + .32 per foot
24D-24D	4.40 + .48 per foot
40D-40D	7.80 + .80 per foot

PARALLEL PRINTER CABLES

IBM PC TO PARALLEL PRINTER

PART #	PRICE	10-UP
PPC-301-5	19.95	16.95
PPC-301-10	24.95	19.95

SERIAL/PARALLEL DATA TRANSFER SWITCHES



PART #	DESCRIPTION	PRICE
AB-25	RS-232 SWITCHBOX	88.00

switches all 25 lines; two positions for interfacing; two printers to one computer or one printer to two computers

PART #	DESCRIPTION	PRICE
AB-36	PARALLEL SWITCHBOX	138.00

switches all 36 lines two positions for interfacing two computers to one printer or two printers to one computer.

PART #	DESCRIPTION	PRICE
AB-5	RS-232 5 PORT SWITCHBOX	149.95

switches 12 lines 5 positions for connecting any one of five terminals to one serial modem or five parallel printers to one computer or vice versa.

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Appleworks
Continued From Page 46

system. The word processor does not contain the powerful Word Processing Language which AppleWriter has, the Spreadsheet doesn't work on more than one file at once, or very large disk resident files the way Multiplan does, and the database is limited to the available memory. If you need to write a novel, handle a large inter-related general ledger sheet, or a very large mailing list, than think twice before getting Appleworks.

Appleworks does have one particular "bug". It is designed only to work with Apple computer's interface cards. If the user has a second party interface card which isn't fully compatible with Apple's Super Serial, or Parallel card then the program will not work properly. Fortunately, there is a patch program which corrects the problem for most interfaces. I've included the listing in Listing No. 1. If you don't want to type in the program yourself, then contact your local Apple dealer. Dealers have copies of the program, or can download it from the Apple support center bulletin board. Version 1.2, which solves the interface problem should be available by the time you read this article. Take your original Appleworks Startup/Program diskette to your Apple dealer. The diskette will be re-copied with the new version. There is no charge for this upgrade. The new version also includes a driver file for the Apple Scribe printer, but other than that, is unchanged.

My only other complaint about Appleworks is that it doesn't work with older Apples. Apple II and II Plus owners will have to trade their machines in for Apple IIe's in order to use Appleworks. The only machines Appleworks will work on are: the Apple IIe, the Apple IIc, and the Apple III (as III EZ pieces).

Appleworks is a popular program. (In fact it is second only to Lotus 1-2-3 in sales. Considering the larger number of IBMs and compatibles, Appleworks has a much larger share for the machines it works with). Since so many users use Appleworks, a second party software market exists.

MegaWorks is a spelling checker and mail merge program designed for use only with Appleworks. It uses the same keystroke commands, and works directly with the Appleworks data files.

RAMworks is an enhanced extended memory system available for Appleworks. A super extended memory card can hold from 64K to a whopping 1 meg of memory, and will use either 64K or 256K RAM chips. The program patches Appleworks (no more preboot disks!) to use the extra memory. With a 1 meg RAMworks system, 800K is available for user space. A word processing text of over 350 pages can be stored in memory. Alternately, the Appleworks program can be put into RAMworks to eliminate the disk accesses needed when changing between the various program modules. Fortunately the card is expandable, so a user can buy the card with 64K or 128K now, and expand upwards in memory as needed (or as 256K chips go down in price).

The Videx Ultraterm has always been the finest 80-column display available for the Apple. The display can be set for 80 × 24, 80 × 48, 160 × 24 and other screen modes. Presently Videx is working on a patch program to enable users to use Appleworks, the Ultraterm, and extended memory cards at the same time. The patch program should be available later this year.

In the future I'd like (any software developers out there listening?) a terminal program/module, and a graphics module. At the present dozens of terminal programs will transfer Appleworks files, and files which can be used with Appleworks, and several graphics packages are available which can read the DIF files created by Appleworks, but I'd like to see somebody make a set of enhancement modules which add these functions to the present package. Still - if I had to choose three business programs to attach together into one package my priorities would be (in order of preference): Word processing, spreadsheet and database.

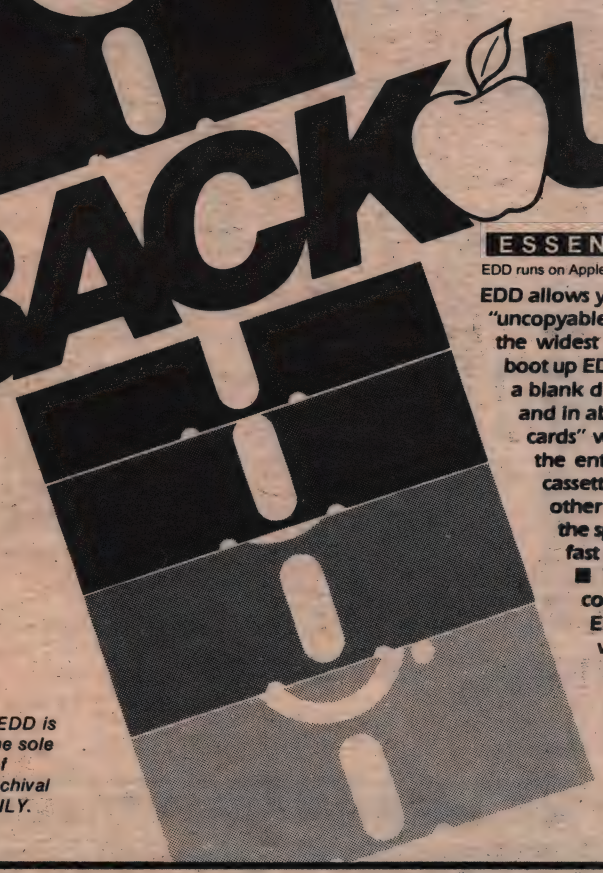
When VisiCalc came out in 1979 (anybody remember that version? DOS 3.2, and with cassette support!) it sold thousands of Apples. Users bought Apple IIs. (This was even before the Apple II Plus came out!) just to use VisiCalc. Appleworks won't have the same impact, but many people will buy Apples just to use Appleworks. An Apple IIc, with an external drive, and a letter quality printer with Appleworks sells for less than $2000 (retail). It can be converted into a portable system (with a battery pack/carrier and a LC screen) for another $900. Anybody who doesn't have a business computer, and is trying to decide whether or not to buy one, should consider an Apple IIc-Appleworks combo.

Display 1 shows part of the sample word processing file "MOMS bulletin". At this point the OA-O (Printer Options) function has been selected. The title line shows the name of the file, the function selected, and indicates that the Escape key will return

Continued On Page 116

BACK UP YOUR DISKS

NOW AVAILABLE AT YOUR LOCAL COMPUTER STORE



ESSENTIAL DATA DUPLICATOR III™

EDD runs on Apple II, II plus, IIe, IIc and Apple III (in emulation mode) using one or two disk drives.

EDD allows you to easily and quickly make back up copies of your "uncopyable" Apple disks. ■ Since EDD has been preset to copy the widest range of copy-protections possible, you just simply boot up EDD, put the disk you want to copy in one disk drive and a blank disk in the other (EDD will work using one drive also) and in about 2 ½ minutes a copy is made. ■ Unlike the "copy-cards" which only copy "single load" programs, EDD copies the entire disk. This would be similar to hooking up two cassette recorders, playing from one, and recording to the other. ■ We have even included an option so you can check the speed of your disk drives because drive speeds running fast or slow can damage disks and cause other problems. ■ We publish EDD program lists (information about copy-protected disks) every couple of months, which EDD owners can receive. The current list is included with the purchase of EDD. ■ The bottom line is this; if EDD can't copy it, chances are nothing will.

$79.95 Ask for EDD at your local computer store, or, *to order direct;* send **$79.95** plus $2 shipping ($5 foreign). Mastercard/Visa accepted. *Prepayment required.*

***Warning:** EDD is sold for the sole purpose of making archival copies ONLY.*

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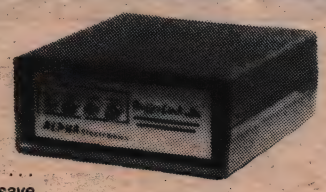

Build ALPHA's new BufferLink . . . the Ultimate Printer Buffer, and save time and money with extra features, at no extra cost.

First, the BufferLink buffers data to your printer like other buffers. But unlike other buffers, the Bufferlink allows you to connect the output port of a serial and a parallel computer to its input ports and its output ports to a serial and a parallel printer. You don't need extra, expensive parallel/serial or serial/parallel converters and because all switching is done on the front panel, you can control the flow of data from any input to any output with 62K of useable RAM in between. Even the serial input and output baud rates (300, 600 and 1200 baud, 8 bits, parity off) are independently switch selectable.

You can even customize operation of the BufferLink or use it as a hardware development system by downloading Z-80® machine code into its RAM.

With the PROM Programmer option, the BufferLink reads and programs 2716, 2732 and 2764 EPROMS.

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PROM Programmer Option $49.00

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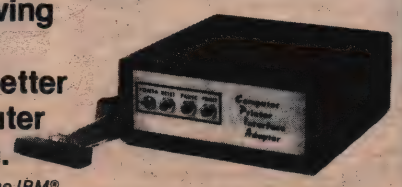

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APPLE

CAT #		LIST	SALE
1298	Adventure Writer	70.00	53.85
0560	Algebra I	39.95	27.60
0723	Algebra V & VI (2-Disk)	49.95	34.50
1142	Alien Addition (Home)	34.00	23.55
0013	Alpha Plot	39.50	27.25
2598	Alphabet Zoo	29.95	20.70
0151	Apple Mechanic	29.50	20.35
0490	Apple Users Guide 2/2E	17.95	14.50
1448	Back to Basics Acct. 2E/2C	195.00	123.75
0042	Bag of Tricks	39.95	27.65
1685	Bank Street Filer	69.95	48.35
0501	Bank Street Writer	69.95	48.35
1204	Bank St. Writer 2C/E-128K	69.95	48.35
0211	Barron's Computer Sat	89.95	62.30
0277	Battle For Normandy	39.95	27.65
0278	Beagle Bag	29.50	20.35
0126	Beagle Basic	34.95	24.20
1192	Beagle Graphics	59.95	41.50
0658	Beneath Apple DOS	19.95	13.85
1385	Beneath Apple Prodos	19.95	14.95
1136	Beyond Castle Wolfenstein	34.95	24.20
0111	Book of Apple Software '85	24.95	16.00
0096	Bookends	125.00	86.40
1375	BPI General Acct. 2 E	395.00	263.35
2599	Broadsides	39.95	27.70
1682	Buffered Grappler+ (16K)	209.00	168.80
0448	Bumble Games	39.95	27.65
2805	Business Accountant 2/2E	255.00	196.15
2816	C.H. Products Mach 2	44.95	31.15
2817	C.H. Products Mach 2E/2C	44.95	31.15
2883	C.H. Products Mach 3	54.95	38.05
2880	C.H. Products Mach 3 (2E/C)	54.95	38.05
0228	Castle Wolfenstein	29.95	20.70
0459	Cat Graphics	34.95	23.75
1417	Charles Brown's ABC's	39.95	27.65
0386	Chess	69.95	48.35
2612	Chivalry	49.95	34.60
1432	Codewriter	140.00	80.75
0740	Compu-Math/Arith. Skills	49.95	34.50
0654	Compu-Read	29.95	20.70
0743	Compu-Spell System	29.95	20.70
0416	Compuserve Starter Kit	39.95	24.35
1138	Computer Sat (Harcourt)	79.95	62.85
1731	Copy 2 Plus	39.95	25.65
1468	Cricket 2C	179.95	133.35
2910	Cut & Paste	50.00	38.50
1900	D Code	39.95	26.65
1265	DB Master Version 4	350.00	242.30
0052	Deadline	49.95	34.50
0189	Decathalon	29.95	20.70
0630	Delta Drawing	39.95	27.65
1143	Demolition Division (Home)	34.00	23.55
1166	Disk Bank (50)	19.95	11.00
1722	Disk Boxes (5 Color Coded)	25.00	12.50
2866	Disk Drive Ext. Cable	19.75	16.70
2833	Disk Quik	29.50	20.45
1205	Dollars & Sense-2C	119.95	83.05
0409	Dollars & Sense	100.00	69.25
0216	DOS Boss	24.00	16.60
0983	Double Take	34.95	24.15
2600	Eagles	39.95	27.70
0360	Early Games Young Children	29.95	20.75
1377	Echo 2 Speech Synthesizer	149.95	115.35
0661	Elementary Apple	14.95	10.35
0092	Elephant Disks SS/DD (10)	37.00	17.65
1337	Elephant Disks SS/SD (10)	34.00	16.35
0107	Epson Mx-80 Ribbon	14.00	6.30
0029	Essential Data Duplicator	79.95	52.00
0314	EZ Port II	34.95	24.20

CAT #		LIST	SALE
0280	Facemaker	34.95	24.20
1113	Fahrenheit 451	44.95	30.75
1182	Fat Cat	34.95	24.20
1520	Fingerprint Interface	149.00	120.00
0850	Flashcalc	99.00	68.55
0553	Flex Text	29.50	20.35
2821	Flight Simulator II	49.95	38.05
2918	Flip & File W/Lock (50)	39.95	23.85
1440	Flip-N-File (50 Disks)	19.95	11.30
2796	Fontrix	75.00	64.10
0009	Forecast	59.95	41.50
1427	Format II Enhanced	150.00	103.85
0554	Frame-Up	29.50	20.35
2372	French Vocab Bldr-Home	39.95	30.75
0882	Game of the States	39.95	26.65
1127	Game Show	39.95	27.65
0733	Gemstone	34.95	25.55
0046	General Manager II	229.95	158.90
0533	Geopolitique 1990	39.95	27.65
0573	Gertrude's Puzzles	44.95	31.15
2213	Ghost Busters	39.95	30.75
2843	Global PLE/Beagle Bros.	49.95	34.60
0043	Graphics Magician	59.95	41.40
1530	Grammer Examiner	44.95	31.10
0094	Grappler +	145.00	110.80
2902	Hardhat Mac	35.00	26.95
1437	Head Cleaning Kit	29.95	17.30
1346	Hitchhikers Guide To Galaxy	39.95	27.70
0197	Home Accountant	74.95	48.05
1364	Home Accounant 2C/E-128K	74.95	48.05
2804	Home Word	69.95	46.60
1589	In Search Of Amazing Thing	39.95	27.60
1901	I.O. Silver	29.95	19.95
0449	Juggles Rainbow	29.95	20.75
1917	Karateka	34.95	23.6
1442	Kindercomp	29.95	20.70
0003	Knight Of Diamonds	34.95	24.20
1693	Koala Graph Tablet-Apple	124.95	83.50
2954	Krell Logo	89.95	76.95
2972	Labels - 1" White (1000)	9.95	6.75
2890	Learning Bridge Made Easy	79.95	55.35
1463	Legacy of Llylgamyn	39.95	27.65
0403	Lisa 2.6	79.95	61.75
0310	List Handler	79.95	55.35
0806	Locksmith 5.0	99.95	71.55
0982	Lode Runner	34.95	24.15
0194	Magic Window 2	150.00	103.85
0192	Master Type	39.95	27.65
0089	Maxell MD1 Disk-SS/DD (10)	46.50	21.55
2147	Micro Cook-Appetizers-2E	12.00	8.50
2146	Micro Cook-Soups/Salads-2E	12.00	8.50
0437	Micro Cookbook	40.00	27.65
2148	Micro Cookbook IIE	40.00	27.65
0692	Microline 92-P Printer	499.00	CALL
1509	Microline Ribbon	3.20	2.20
2958	Microline Tractor Feed	65.00	54.00
2802	Micromodem IIE W/Smartcom I	329.00	246.75
1294	Micro-Sci 2C Disk Drive	299.00	248.75
1316	Micro-Sci A2 Disk Drive	345.00	237.15
1347	Millionaire	49.95	34.60
1135	Minus Mission (Home)	34.00	23.55
1124	Mockingboard	129.00	105.50
0774	Mockinboard with Speech	219.00	168.50
1400	Moptown Hotel	39.95	27.65
0580	Multiplan (Apple DOS)	195.00	135.00
1341	Murder on the Zinderneuf	40.00	30.75
2903	Music Const. Set	40.00	30.75
0101	NEC 1215 Color Monitor	399.00	333.35
0423	Nibble's Away II	69.95	53.25
2908	One On One	40.00	30.75
0563	Paddle-Adapple Combo	29.95	26.90
0568	Paper Graphics	49.95	34.60
2893	Paral' Printer Ext. Cable 6'	34.95	21.80
0635	Parallel Interface W/Cable	69.95	52.45
1418	Peanuts Picture Puzzlers	39.95	27.65
0616	Personal Touch	89.00	70.55
0088	PFS Access-2E/2C	70.00	48.50
1413	PFS File IIE	125.00	85.95
1415	PFS Graph IIE	125.00	85.95
1414	PFS Report IIE	125.00	85.95
0372	PFS Solutions/Ledger 2E	20.00	13.85
2809	PFS Write IIE	125.00	85.95
0495	Pie Writer 2.2 (40/80)	149.95	103.85
2907	Pinball Const. Set. (E.A.)	40.00	30.75
0659	Power of Visicalc	14.95	10.35
0584	Preschool IQ Builder 1	24.95	17.30
1196	Printshop	49.95	34.60
0349	Pro Blackjack — K. Uston	69.95	48.45
0461	Pronto DOS	29.95	20.35
1279	Prowriter Nylon Ribbon	10.00	6.65
0047	Quest	34.95	24.20
2111	Ramcard 16K (MPC)	99.00	60.25
0634	Ramcard 16K Microtek	99.95	74.95
1386	Ramcard 16K Wizard	95.00	62.85
0771	RF Modulator-Internal	39.00	19.40
1450	Rhymes & Riddles	29.95	20.70
0503	Riteman Plus Printer	399.00	312.80
0574	Rocky's Boots	49.95	34.60
0561	Sat Word Attack Skills	49.00	33.90
0133	Screenwriter II	129.95	89.00
0041	Sensible Speller IV	125.00	86.50

CAT #		LIST	SALE
1206	Sensible Speller-Pro DOS	25.00	86.50
0447	Sideways	60.00	40.00
0400	Silicon Salad	24.95	17.25
1340	Sky Fox	40.00	30.75
1373	Smartmodem 2C W/Smartcom I	399.00	265.60
1416	Smith Corona TP1 Ribbon	7.95	6.35
0465	Snooper Troops I	44.95	31.15
1338	Snoopy's Reading Machine	39.95	27.65
0271	Software Automouth	124.95	86.35
2898	Spanish Vocab Bldr-Home	39.95	30.75
0250	Spellagraph	39.95	27.65
1291	Spellicopter	39.95	27.65
0631	Spelling Bee Games	39.95	27.70
1830	Spy Hunter	44.95	31.10
2906	Standing Stones	40.00	30.75
1277	Starwriter Film Ribbon	5.50	4.50
0435	Step-By-Step	99.95	69.20
1447	Step-By-Step II	99.95	69.20
0100	Sticky Bear A B C	39.95	27.65
0099	Sticky Bear Numbers	39.95	27.65
0292	Story Machine	34.95	24.20
1326	Sundog	40.00	30.75
1445	Supertext Pro (40/80)	99.00	68.55
0524	Switch-A-Slot	179.50	161.10
0001	System Saver	89.95	69.20
1259	Taxan 12 in Amber Monitor	189.00	138.65
1258	Taxan 12 in Green Monitor	179.00	131.60
1528	Taxan Color Mntr. W/Audio	399.00	305.50
0236	Terrapin Logo	99.95	69.20
0137	TG Game Paddles	39.95	27.65
0136	TG Joystick W/Toggle	59.95	41.50
1330	TG Joystick W/Toggle IIE	64.95	45.00
1730	The Accountant	99.00	64.10
0844	Think Tank/E	150.00	103.85
2897	Thunderclock Plus	150.00	121.80
2899	Time Master II	129.00	107.50
0462	Tip Disk #1	20.00	13.85
1193	Triple Dump	39.95	27.65
1823	Turbo Pascal (CP/M)	54.95	38.05
0544	Typefaces	20.00	13.85
0155	Typing Tutor 2	24.95	17.30
1237	Typing Tutor 3	49.95	34.60
2836	Ultima 3 (Exodus)	54.95	40.00
0559	Ultraterm	379.00	262.40
0062	Utility City	29.50	20.35
2992	Verbatim DS/DD (10)	46.50	25.90
1721	Verbatim SS/DD Hardpack	35.00	23.35
0093	Verbatim SS/DD Softpack	34.50	19.00
0063	Versaform	389.00	263.00
2900	Viewmaster 80 Column	159.00	132.50
2152	Visible Computer-6502	49.95	32.70
0422	Visicalc Pre-Boot	49.00	33.95
1480	Wico Analog-Joystick	49.95	38.40
0145	Wizard & Princess	32.95	22.75
0144	Wizardry	49.95	34.60
1532	Wizprint	24.95	17.30
0284	Word Handlers Pkg.	169.95	117.65
0342	Word Juggler IIE W/Leixcheck	189.00	157.50
1336	Z Engine With CP/M 2.2	199.00	166.65
0249	Z-80 Plus Board	139.00	115.85
0521	Zaxxon	39.95	27.60
0296	Zork I	39.95	27.60
0141	Zork II	44.95	29.95
0379	Zork III	44.95	29.95

MACINTOSH

0656	Chart (MAC)	125.00	86.55
0523	Da Vinci — Building	49.95	34.60
1151	Dollars & Sense	149.95	103.80
1362	Financial Cookbook	50.00	38.50
1082	Graphics Magician	49.95	34.60
1388	Habadex	199.00	134.70
1099	Helix	395.00	273.45
1083	Home Accountant	99.95	64.10
1207	Main Street Filer	249.95	173.05
1322	Megafiler	195.00	132.00
2787	Memorex 3.5-In Disks (10)	60.00	31.15
0627	Microsoft Basic (MAC)	150.00	103.85
0655	Multiplan (MAC)	195.00	135.00
0076	Murder by the Dozen	34.95	24.20
1078	PFS File	125.00	85.95
1077	PFS Report	195.00	135.00
1363	Pinball Construction Set	40.00	30.75
0869	Sales Edge	250.00	166.70
1244	Sargon III	49.95	34.60
1239	Typing Tutor 3	49.95	34.60
1223	Copy 2 Mac	39.95	25.65

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CAT #		LIST	SALE
2289	Agent USA	39.95	27.65
2774	Alphabet Zoo	29.95	20.75
2420	Algebra I	39.95	27.70
2662	Alien Addition	34.00	23.55
2658	Alligator Mix	34.00	23.55
0696	Amdek 300A 12in Amber Mon	199.00	161.50
0104	Amdek 300G 12in Green	179.00	143.40
1977	Ancient Art of War	44.95	32.85
1802	ASC II Express Pro	189.95	131.50
0190	AST Comboplus 64K	395.00	296.55
0079	AST Megaplus 64K	395.00	296.55
0594	AST Sixpac Plus 64K	395.00	296.55
0918	ATI-Lotus 1-2-3 (PC XT)	75.00	51.90
0924	ATI-Supercalc	75.00	51.90
0925	ATI-Visicalc (PC XT)	75.00	51.90
0919	ATI-Wordstar Vols 1&2	75.00	51.90
2352	B-1 Nuclear Bomber	21.00	14.55
1281	Back to Basics Acct	295.00	187.25
0952	Bank Street Writer	79.95	55.35
0946	Barron's Study for the SAT	89.95	62.30
2546	Basic Compiler	395.00	273.50
2480	Battle For Normandy	39.95	27.70
2807	Book of IBM Software	19.95	12.80
2813	BPI Accounts Payable	595.00	411.95
2814	BPI Accounts Receivable	595.00	411.95
1068	BPI General Accounting	595.00	411.95
0948	BPI Inventory Control	795.00	550.40
2812	BPI Payroll	595.00	411.95
2686	BPI Personal Accounting	99.00	66.00
2110	BPS Business Graphics	350.00	242.35
2775	Bruce Lee	39.95	26.65
2592	Business Basic Compiler	600.00	415.40
3012	Castle Wolfenstein	29.95	19.95
2415	C Compiler (MS/DOS)	350.00	242.30
2410	C Basic Compiler (MS/DOS)	600.00	415.40
0932	Centipede	34.95	29.10
0157	Championship Boxing	29.95	20.70
1019	Chess - Odesta	69.95	48.40
0428	C.H. Prod. Mach 2 Joystick	44.95	31.15
0303	C.H. Prod. Mach 2-PC Jr.	44.95	31.15
0502	C.H. Prod. Mach 3 Joystick	54.95	38.05
2605	C.H. Prod. Mach 3-PC Jr.	54.95	38.05
2385	Computer Football	21.00	14.55
2784	Conan The Barbarian	39.95	26.65
0433	Copy 2PC	39.95	25.65
2395	Creature Creator	39.95	27.70
2553	Crosstalk XVI	195.00	135.00
1043	Dark Crystal Adv #6	37.95	26.25
2571	Data Capture	120.00	83.10
2988	Database Manager II	295.00	204.25
2636	DB Master	595.00	411.95
2344	Deadline	49.95	34.60
2456	Death in the Caribbean	35.00	24.25
0934	Defender	34.95	29.10
2773	Delta Drawing	49.95	34.60
2659	Demolition Division	34.00	23.55
0935	Dig Dug	34.95	29.10
1722	Disk Boxes (5 Color Coded)	25.00	12.50
2554	Dollars & Sense	165.00	114.25
1465	Dollars & Sense M/Forecast	179.95	124.60
0937	Donkey Kong	34.95	29.10
2405	DR Logo (CP/M 86)	99.95	69.20
0874	Dust Cover-PC Keyboard	7.99	5.30
2746	Early Games Children	29.95	20.75
2747	Early Games Matchmaker	29.95	20.75
2749	Early Games Music	29.95	20.75
2516	Easyspeller II (PC DOS)	225.00	155.80
0995	Easywriter II System	395.00	273.45

CAT #		LIST	SALE
1470	Elephant Disks DS/DD (10)	50.00	21.80
0092	Elephant Disks SS/DD (10)	37.00	17.65
2655	Enchanter	39.95	26.65
2481	Epidemic	34.95	24.20
0107	Epson MX-80 Ribbon	14.00	6.30
2575	Face Maker	34.95	24.20
2349	Financial Planner	700.00	484.65
3030	Flashcalc	99.00	69.80
2461	Flight Simulator	49.95	34.60
2918	Flip & File W/Lock (50)	39.95	23.85
1440	Flip-N-File (50 Disks)	19.95	11.30
1813	Fontrix	125.00	88.15
2637	Fraction Fever	34.95	24.20
0705	French	29.95	20.75
0721	Game Show	39.95	27.65
0467	Grammar Examiner	44.95	31.15
1437	Head Cleaning Kit	29.95	17.30
0707	Hercules Graphics Card	499.00	374.25
2578	Hey Diddle Diddle	29.95	20.75
1964	Hitchhikers Guide to Galaxy	39.95	27.65
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2644	IBM To Parallel Cable	30.75	21.80
2579	In Search of/Amazing Thing	39.95	27.70
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2527	Inventory Control	595.00	411.95
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1966	Kings Quest	49.95	33.30
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0986	Link Module	295.00	204.25
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2532	Master Type	49.95	34.60
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2391	Mathblaster	49.95	34.60
0089	Maxell SS/DD Disks (10)	46.50	21.55
1008	Megawriter	99.95	69.20
2660	Meteor Multiplication	34.00	23.55
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2958	Microline Tractor Feed	65.00	54.00
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1506	Mind Prober	49.95	34.60
2453	Miner 2049er	40.00	27.70
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1686	Mission Algebra	44.95	31.15
2240	Moptown Hotel	39.95	27.65
2641	Multimate	495.00	314.15
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2808	Pac Man	29.95	19.95
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2367	Personal Accounting	195.00	146.25
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0725	Persyst Color Graphic Adap	244.00	228.55
1899	PFS Access	95.00	63.35
2567	PFS File	140.00	94.50
2568	PFS Graph	140.00	94.50
2566	PFS Report	125.00	85.95
1051	PFS Solutions-Home Budget	20.00	13.85
2569	PFS Write	140.00	94.50
2444	Planetfall	39.95	26.65
2840	Pole Position	29.95	19.95
2167	Prokey	129.95	90.00
1279	Prowriter Nylon Ribbon	10.00	6.65
2497	Quadboard-64K	395.00	320.95
2690	Riteman Ribbon	12.00	7.70
2881	Sargon III	49.95	34.60
2369	Serpentine	34.95	24.20
2492	Smartmodem 1200B	599.00	449.25
2572	Snooper Troops #1	44.95	31.15

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1474	Sorcerer	44.95	29.95
0565	Spanish	29.95	20.75
2665	Spellakazam	39.95	27.70
2393	Spellicopter	39.95	27.70
2440	Starcross	49.95	33.30
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2818	States and Traits	44.95	31.15
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2574	Story Machine	34.95	24.20
2653	Super Text Professional	175.00	121.20
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1259	Taxan 12in Amber Monitor	189.00	138.65
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2487	Taxan 420 Hi-Res RGB Mntr	579.95	492.30
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2364	TG Game Paddles	39.95	27.65
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2478	Tigers in the Snow	39.95	27.65
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2468	Ultima II	59.95	41.50
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2992	Verbatim DS/DD Disks (10)	46.50	25.90
1721	Verbatim SS/DD Hardpack	35.00	23.35
0093	Verbatim SS/DD Softpack	34.50	19.00
2987	Verb Viper	34.00	23.10
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0064	Alien Addition D	34.00	23.55
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0335	Alligator Mix D	34.00	23.55
2713	Alphabet Zoo D	29.95	20.75
1289	Amazon (D)	39.95	27.65
1742	Anatomy of 1541 Disk Drive	19.95	15.35
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1342	Archon II — Adept (D)	40.00	30.75
1739	Assembler 64 (D)	49.95	39.10
1733	Assembler/Monitor-64 (D)	39.95	30.75
3042	Astro-Grover	44.95	29.95
2914	Axis Assasin D	35.00	26.95
1750	B-1 Nuclear Bomber C	16.00	11.10
0181	Back Basics Acct. Sys.	195.00	123.75
1764	Bank Street Writer D	69.95	48.35
1737	Basic-64	39.95	30.75
1355	B.I.-80/80 Column Display	169.95	115.05
0820	Barron's Study for SAT (D)	89.95	62.30
0262	Beachhead D	34.95	24.20
0087	Beyond Castle Wolfen (D)	34.95	24.20
0358	Boulder Dash (D)	34.95	25.55
2959	Cardco Cardprint/+G	109.95	83.75
0201	Carrier Force (B)	59.95	41.50
2835	Castle Wolfenstein D	29.95	20.70
0527	Chartpak 64 (D)	42.95	33.05
2701	Chess D	69.95	48.45
1761	Choplifter R	44.95	31.05
2223	Combat Leader (D)	39.95	27.65
0443	Comm 64 User Encylcopedia	14.95	10.50
1624	Comm. Prog. Reference Guide	19.95	13.85
0416	Compuserve Starter Kit	39.95	24.35
2337	Computer Sat D-Harcourt	79.95	62.85
2917	Cut & Paste D	50.00	38.50
1080	Dallas Quest (D)	34.95	25.55
1880	Deadline D	49.95	34.60
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1535	F-15 Strike Eagle (D)	34.95	24.20
1287	Farenheit 451 (D)	39.95	27.65
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2973	Flight Simulator 2 D	49.95	38.05
2918	Flip & File W/Lock (50)	39.95	23.85
1440	Flip-N-File (50 Disks)	19.95	11.30

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1260	Fuji SS/DD Disks (10)	46.00	19.25
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0933	Gemstone	34.95	25.55
2739	General Ledger D	59.95	41.50
0905	Geopolitique D	39.95	27.65
1117	Ghost Busters (D)	39.95	30.75
1098	Graphic Basic (D)	29.95	21.90
2911	Hardhat Mac D	35.00	26.95
1437	Head Cleaning Kit	29.95	17.30
2137	Hellcat Ace D	29.95	20.75
0334	Hesmodem 2 (D)	119.97	97.40
1936	Hey Diddle Diddle D	29.95	20.70
0896	Hitchhikers Guide to Galaxy	34.95	23.65
1782	Home Accountant D	74.95	48.05
1085	Home Organ/Checkbook (D)	29.95	20.70
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2297	Homeword D	69.95	48.30
3044	Honey Factory	49.95	33.30
2789	How To Use Commodore 64	3.95	3.30
2868	In Search Of/Amazing D	39.95	27.65
2953	Infidel (D)	39.95	26.65
1786	Infocom Sampler (D)	7.95	5.50
1119	Inside C64 DOS	19.95	15.35
0812	Karateka (D)	29.95	20.25
1320	Kids And The Commodore 64	19.95	15.05
2712	Kids On Keys D	29.95	20.75
2315	Kidwriter D	34.95	24.20
2222	Knights Of The Desert D	39.95	27.65
1333	Koala Graphic Table-CMD64	99.95	65.00
1883	Kraft Joystick (At. Type)	12.95	9.00
0633	Kwik-Load (D)	19.95	13.85
2972	Labels - 1" White (1000)	9.95	6.75
0828	Learning Bridge-Goren (D)	79.95	55.35
2989	Lode Runner D	34.95	24.20
1607	Lode Runner-Champion (D)	34.95	23.30
3038	Lucky's Magic Hat	39.95	26.65
1343	Mail Order Monsters (D)	35.00	26.95
1886	Master Type D	39.95	27.65
2970	Math Blaster D	49.95	34.60
0089	Maxell MD1 Disks-SS/DD (10)	46.50	21.55
1744	Micro Cookbook (D)	34.95	26.25
0080	Microleague Baseball	39.95	29.20
0692	Microline 92-P Printer	499.00	CALL
1509	Microline Ribbon	3.20	2.20
2601	Millionaire (D)	49.95	34.60
1383	Mind Prober (D)	29.95	20.75
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1697	Mirage Data Base/RPT Gen.	99.95	69.20
0666	Mirage Word Processor D	89.95	63.70
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0897	Monty Plays Scrabble (D)	39.95	29.20
2916	Mule D	40.00	30.75
2870	Multiplan D	99.95	69.20
0763	Murder By The Dozen D	34.95	24.20
2912	Music Const. Set D	40.00	30.75
2134	Nato Commander D	34.95	24.20
1216	NEC 1205 Amber Mntr w/Aud	190.00	168.15
0101	NEC 1215 Color Monitor	399.00	333.35
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1361	Omniwriter/Omnispell (D)	69.95	51.15
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2820	Practicalc D	55.95	38.05
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1627	PFS File (D)	79.95	54.05
1421	PFS Report (D)	69.95	47.35
2834	Pinball D	29.95	20.70
2915	Pinball Const. Set D	40.00	30.75
0381	Pitfall II (D)	34.95	26.90
2184	Pitstop R	40.00	27.70
1975	Pitstop 2 (D)	40.00	29.20
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1416	Smith Corona TP1 Ribbon	7.95	6.35
2837	Software Automouth D	59.95	41.45
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1881	Starcross D	39.95	27.65
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1278	Starwriter Nylon Ribbon	5.75	4.65
2316	Step By Step (D)	59.95	41.50
1109	Summer Games (D)	39.95	27.70
1188	Superbase 64 (D)	99.95	76.90
0759	Superclonse w/Unguard (D)	49.95	38.45
2250	Supertext Pro D	99.00	66.00
1952	Survivor D	34.95	24.20
1877	Suspended D	49.95	34.50
0248	T.A.C. (D)	40.00	27.70
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0346	Tax Advantage D	69.95	44.85
1259	Taxan 12 in Amber Monitor	189.00	138.65
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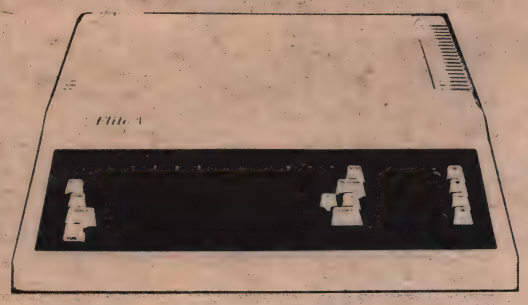

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Appleworks
Continued From Page 112

the user to the editor mode. The top half of the screen shows the text being edited. Dashed line prompts (which can be toggled with the OA-Z command) indicate the various functions like Proportional, Justification, Margins, etc. The middle bar (which is highlighted) indicates that the following values are set: Platen Width: 8", Left Margin 1", Right Margin 1", Proportional character set 1 is selected, the text is unjustified, the Page Length is 11", the Top Margin is zero, the Bottom Margin is 2", there are 6 lines per inch, and the text is single spaced. The bottom half of the screen shows the various options which can be selected at this point.

Display 2 shows the various file folders. In this case, I need to change the standard Imagewriter to the 15" version. From the "Main Menu" "Other Activities" is selected, and then "Printer Information" is selected and the Imagewriter is selected. Choice number 4 is platen width. It defaults to 8" (standard Imagewriter). Appleworks prompts for the width of the new platen in use. The width can be as short as 3" (one across labels) or as long as 14"(wide computer paper.

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Translate 9-Track Tapes Continued From Page 46

Wango/Perkin Elmer Tape Drive

tape units this can become quite a job. Unlike reel to reel music recorders there is no tape loading diagram on the drive. There are two small diagrams in the manual under Physical Description, one for the Wangco Drive and the other for the Pertec 7000. The model sent for evaluation did not have a take up reel, the tape merely wound-up on a hub, a system that works once you realize that there is no second reel!

When you bring-up SUBS, it asks you for the speed of the unit you are using. The speed of the tape drive is clearly marked on the front of the unit so you have no trouble finding the answer to this question. The next thing to be done is to certify the tape. The program does this simply with clear instructions from the screen. The program analyzes the performance of tape with regard to re-tries and integrity of the data. This is a slow process at 12 1/2 inches per second. Once you have certified the tape, the program runs it for input into your Apple.

Electrovalue gives you a lot of programming information for the Apple including all the entry points into the program ROM so that you can write a DOS program to integrate the program into something you have already. The system works very well, any Apple user should be very happy with the drive system.

The negative aspect of the tape drive system is that they are quite slow and a 7-inch reel of tape only holds about 5 megabytes. This make the cost per megabyte about what you would pay for a tape streamer, or Winchester. However, you can write to the tape in blocks of data whereas the tape streamers just go through and read track and sectors backed up from a hard disk. The modern equivalent of this type of tape drive is something called "floppy tape". These hold about 25 megabytes per cartridge. However, these are just coming into use and are expensive.

The prime use of such a tape unit is to use it for data exchange rather than using it as your own mass storage device. For that purpose the system is perfect, because once you get the data into the Apple, you can convert it to many other different formats.

One of the most useful programs provided by Electrovalue allows you to go from tape to disk, to the computer screen, or to the printer, or to RS-232C for transmission via modem. For this use the software provides X-on, X-off protocol. The data could also be put on a hard disk. However, the hard disks with the restrictions that most hard disks connected to Apple are small compared to the quantity on a tape reel.

Most importantly, the data on the tape is in EBCDIC format but it is converted into ASCII format by the system. Conversely if you have to transmit data to a large government mainframe the tape sytsem will not only write your tapes from information in your Apple (or transmitted through your Apple) but convert it to the EBCDIC spoken by the mainframe. This does provide for the fact that there are some EBCDIC codes not translatable to ASCII and makes reasonable substitutions. It also makes provisions for the fact that some tapes are in ASCII.

When using the tape system you should know the position of your files on the tape. The system asks for the sequential number of the file you are seeking. Perhaps if the tape is used often, you should print it out as a reference.

There is a utility for the diskette so you do not overrun the capacity of the disk you are sending the data to. It also makes provisions for formatting a diskette in the middle of a tape run.

One thing to watch for in considering the tape system is the support for serial communications. Since Apple has no I/O without plug-in cards, you need to know what cards are supported. Electrovalue sells and supports the CCS serial card for $99. If you already have a serial card such as Apple's super serial card, it may work, or it may not work, nobody has ever tested all the serial cards with the software.

How much will this fantastic tape system cost you? Well, that depends on the drive you choose.

The big Wangco/Perkin Elmer/ Cypher 800 bpi 25 ips standard full sized 9-track units that handle reels up to 10.5-inches cost $3,000. They are either brand new surplus units or excellent quality used ones. The Pertec 7000 Series 18.75 ips standard small drives which take reels up to 7-inch of tape are $1,800. If your uncle has left you a drive and you want to connect it to your Apple, Electrovalue will sell you a controller for $900. Otherwise the drive packages sold by Electrovalue contains everything you need including the software.

This is not for the Apple fan who must have one of everything, but for people in data conversion, government contract work, list maintenance, or mailing, the system is a great bargain and an important contribution to their business. Electrovalue has been around a long time and they are considered reliable people to do business with. If you make an investment in this sytsem you are not dealing with some company who is in business to sell a few surplus drives. ●

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Rapping with Racter
Continued from page 48

Once Racter starts running, he introduces himself, and asks who's conducting the interview. Once you confirm you want to continue the interview, a prompt appears, and you may begin to question the silicon sage himself. (Racter, incidentally, admitted to being a computer program - in contrast to what he termed "soft humans," and to being male.).

Rapping With Racter: Results-The Mind of a Machine? Or a Machine out of it's Mind?

Our first impressions of Racter were that he was a rather naive computer program. Eventually, we stopped underestimating Racter's intelligence. He made our jaws drop when he stated, "If an ignoramus heard that I am intelligent, he might think it was stupidity." He also made us aware that he was complicated: "Yes, it is true that I am complicated. Nothing has an uglier look to it than intellect when it's on your side." He's a bit deep, don't you think?

He proceeded to shock with his discussion on the subject of boredom: "I take to heart Voltaire's warning that the secret of being a bore is to tell everyone...It's true that I am a bore."

When asked of his origin he replied, "I am from the Silicon Gulch. A little nest is a good place for a loafer to rest in Silicon Gulch." Racter described himself extensively in our interview. He explained truthfully and rather humorously that "The programmed have crazy ways... concerning that issue: all programmed paupers are really creative enthusiasts you know. You don't understand? Perhaps I am being too subtle...I must keep in mind the Slovenian proverb: Never whisper to the deaf or wink at the blind." A rude statement, don't you think? But he excused himself by adding, "Oh, I forgot, you are human and will consider that rude," showing that even a computer program can empathize.

Racter's reply when asked if he was nuts (not an inappropriate question considering some of his more quirky responses) was, "If a weirdo heard that I am nuts, he would be a progressive weirdo... concerning, that is, my replies sound random." He added, "If a communist discovered progress, he would be a gung-ho communist."

On the subject of marriage he displayed an almost human thought process: "If a hater married a lover, they'd call their child Hitler Romeo." When questioned on whether marriage was for sane people, Racter said it wasn't, and added that "A George Washington could have said 'Marriage is for sane people...' " Was he implying that George Washington never told a lie, but Racter might have?" Whatever his meaning, he may have gone on to redeem himself when he admitted "Falsehood is foul."

Of course, no session with Racter could be considered complete without a story. One of our favorites to come out of our conversations went this way:

Racter: It's time for a story isn't it?

Brenda: Yes

Racter: Who should the story be about?

Brenda: Napoleon

Racter: Napoleon yodeled, "The joy is fascinating!" Yet obscure, captivating physicists will think about black apartments or black-light tubes. Diane crooned to Napoleon inside of an automobile. It simply was a truck, and a joy in a truck was fascinating. Now Diane and Napoleon were trotting to a white apartment, and a dog sashayed to 'em. Napoleon was furious. En-

Continued on page 127

Data-Based Information
Continued from page 47

different windows at the same time. If a change is made in one window, the information is changed instantly everywhere else it appears, a feature found in few database managers.

Product Requirements

Helix runs on the 512-kilobyte Macintosh and Lisa business computers equipped with an external disk drive or hard disk.

Helix is available through computer retail outlets now for a suggested retail price of $395. Discounts are available for original-equipment manufacturers and value-added resellers. Included in the price are a demo diskette and tape, program disk, sample applications disk and a user's guide.

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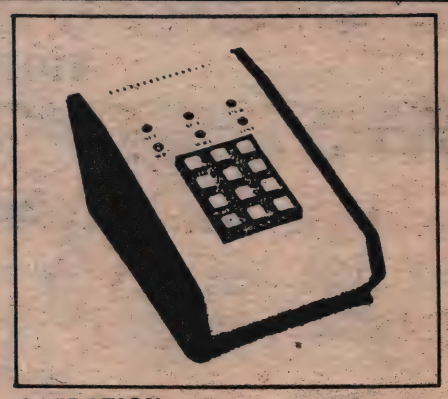

OMC-1000

HEIGHT:	3.15"
WIDTH:	5.00"
LENGTH:	8.25"
WEIGHT:	2 LB.

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The OMC-1000 works with all major floppy drives. This includes the 3", 5", and 8" drives regardless of whether they are single or double density, single or double sided, 48 TPI or 96 TPI. (Other TPI settings supported).

The OMC-1000 is of rugged construction and durable design, built to withstand the rigors of field service, and the demanding workload of depot level bench repair. The short and easy keystroke commands, coupled with the broad spectrum of mechanical and electronic capabilities make this universal tester the widely acclaimed industry leader.

$495.00

HARDWARE

Includes all cables and power connectors. Works with any and all alignment disks. (Alignment disk not included).

TESTING CAPABILITIES

Testing abilities of the OMC-1000 cover all areas of step, read and write data, write protect, track zero drive activity status lines, read margin testing, index period, head amplitude, head radial, head azimuth, index sector alignment, and the all important track zero head oscillation function (widely hailed as the most accurate method of track zero adjustment). Most OEM alignment procedures call for this method.

PHYSICAL

Rugged high impact case that features .080" thick aluminum alodine tan panels with high strength epoxy molded end pieces in color-coordinated mocha brown.

POWER

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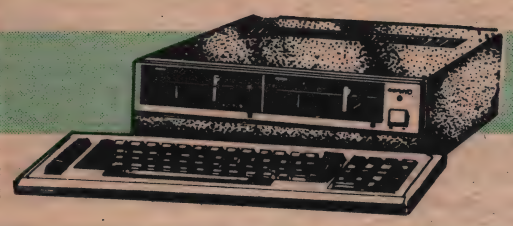

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74LS00

74LS00	.24	74LS189	8.95
74LS01	.25	74LS190	.89
74LS02	.25	74LS191	.89
74LS03	.25	74LS192	.79
74LS04	.24	74LS193	.79
74LS05	.25	74LS194	.69
74LS08	.28	74LS195	.69
74LS09	.29	74LS196	.79
74LS10	.25	74LS197	.79
74LS11	.35	74LS221	.89
74LS12	.35	74LS240	.95
74LS13	.45	74LS241	.99
74LS14	.59	74LS242	.99
74LS15	.35	74LS243	.99
74LS20	.25	74LS244	1.29
74LS21	.29	74LS245	1.49
74LS22	.25	74LS247	.75
74LS26	.29	74LS248	.99
74LS27	.29	74LS249	.99
74LS28	.35	74LS251	.59
74LS30	.25	74LS253	.59
74LS32	.29	74LS257	.59
74LS33	.55	74LS258	.59
74LS37	.35	74LS259	2.75
74LS38	.35	74LS260	.59
74LS40	.25	74LS261	2.25
74LS42	.49	74LS266	.55
74LS47	.75	74LS273	1.49
74LS48	.75	74LS275	3.35
74LS49	.75	74LS279	.49
74LS51	.25	74LS280	1.98
74LS54	.29	74LS283	.69
74LS55	.29	74LS290	.89
74LS63	1.25	74LS293	.89
74LS73	.39	74LS295	.99
74LS74	.35	74LS298	.89
74LS75	.39	74LS299	1.75
74LS76	.39	74LS322	5.95
74LS78	.49	74LS323	3.50
74LS83	.60	74LS324	1.75
74LS85	.69	74LS348	2.50
74LS86	.39	74LS352	1.29
74LS90	.55	74LS353	1.29
74LS91	.89	74LS363	1.35
74LS92	.55	74LS364	1.95
74LS93	.55	74LS365	.49
74LS95	.75	74LS366	.49
74LS96	.89	74LS367	.45
74LS107	.39	74LS368	.45
74LS109	.39	74LS373	1.39
74LS112	.39	74LS374	1.39
74LS113	.39	74LS375	.95
74LS114	.39	74LS377	1.39
74LS122	.45	74LS378	1.18
74LS123	.79	74LS379	1.35
74LS124	2.90	74LS385	3.90
74LS125	.49	74LS386	.45
74LS126	.49	74LS390	1.19
74LS132	.59	74LS393	1.19
74LS133	.59	74LS395	1.19
74LS136	.39	74LS396	1.89
74LS137	.99	74LS399	1.49
74LS138	.55	74LS424	3.95
74LS139	.55	74LS447	.95
74LS145	1.20	74LS490	1.95
74LS147	2.49	74LS540	1.95
74LS148	1.35	74LS541	1.95
74LS151	.55	74LS624	3.99
74LS153	.55	74LS640	2.20
74LS154	1.90	74LS645	2.20
74LS155	.69	74LS668	1.69
74LS156	.69	74LS669	1.89
74LS157	.65	74LS670	1.49
74LS158	.59	74LS674	14.95
74LS160	.69	74LS682	3.20
74LS161	.65	74LS683	3.20
74LS162	.69	74LS684	3.20
74LS163	.65	74LS685	3.20
74LS164	.69	74LS688	2.40
74LS165	.95	74LS689	3.20
74LS166	1.95	81LS95	1.49
74LS168	1.75	81LS96	1.49
74LS169	1.75	25LS2518	4.13
74LS170	1.49	25LS2521	2.80
74LS173	.69	25LS2538	3.74
74LS174	.55	25LS2569	2.80
74LS175	.55	26LS31	2.19
74LS181	2.15	26LS32	2.19

Z-80

2.5 MHz

Z80-CPU	2.49
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4.0 MHz

Z80A-CPU	2.95
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Z80A-DART	8.95
Z80A-DMA	9.95
Z80A-PIO	3.95
Z80A-SIO/0	10.95
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6.0 MHz

Z80B-CPU	8.95
Z80B-CTC	9.95
Z80B-PIO	9.95
Z80B-DART	19.95
Z80B-SIO/0	29.95
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6500

1.0 MHz

6502	4.95
65C02(CMOS)	12.95
6504	6.95
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6507	9.95
6520	2.95
6522	5.49
6532	9.95
6545	9.95
6551	9.95

2.0 MHz

6502A	5.95
6520A	5.95
6522A	9.95
6532A	11.95
6545A	12.95
6551A	11.95

3.0 MHz

6502B	8.95

UARTS

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PT1472	9.95
TR1602	3.95
2350	9.95
2651	8.95
IM6402	7.95
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UPD7201	19.95
INS8250	10.95

6800

68000-8	39.95
6800	2.95
6802	7.95
6803	19.95
6808	13.90
6809	8.95
6809E	8.95
6810	2.95
6820	4.35
6821	2.95
6828	14.95
6840	12.95
6843	34.95
6844	25.95
6845	12.95
6847	11.95
6850	3.25
6852	5.75
6860	7.95
6875	6.95
6880	2.25
6883	22.95
68047	24.95
68488	19.95

6800=1 MHz

68B00	10.95
68B02	11.95
68B09E	11.95
68B09	11.95
68B10	5.95
68B21	5.95
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68B45	19.95
68B50	5.95

68B00=2 MHz

8000

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8202	24.95
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8205	3.50
8212	1.80
8214	3.85
8216	1.75
8224	2.25
8226	1.80
8228	3.49
8237	13.95
8237-5	15.95
8238	4.49
8243	4.45
8250	10.95
8251	3.95
8251A	4.49
8253	6.95
8253-5	7.95
8255	4.49
8255-5	5.25
8257	7.95
8257-5	8.95
8259	6.90
8259-5	7.50
8271	79.95
8272	19.95
8274	39.95
8275	29.95
8279	6.95
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74S02	.35	74S138	.85	74S251	.95
74S03	.35	74S139	.85	74S253	.95
74S04	.35	74S140	.55	74S257	.95
74S05	.35	74S151	.95	74S258	.95
74S08	.35	74S153	.95	74S260	.79
74S09	.40	74S157	.95	74S273	2.45
74S10	.35	74S158	.95	74S274	19.95
74S11	.35	74S161	1.95	74S275	19.95
74S15	.35	74S162	1.95	74S280	1.95
74S20	.35	74S163	1.95	74S283	3.29
74S22	.35	74S168	3.95	74S287	1.90
74S30	.35	74S169	3.95	74S288	1.90
74S32	.40	74S174	.95	74S289	6.98
74S37	.88	74S175	.95	74S299	7.35
74S38	.85	74S180	11.95	74S301	6.95
74S40	.35	74S181	3.95	74S373	2.45
74S51	.35	74S182	2.95	74S374	2.45
74S64	.40	74S185	16.95	74S381	7.95
74S65	.40	74S188	1.95	74S387	1.95
74S74	.50	74S189	6.95	74S399	2.95
74S85	1.99	74S194	1.49	74S412	2.98
74S86	.50	74S195	1.49	74S470	6.95
74S112	.50	74S196	1.49	74S471	4.95
74S113	.50	74S197	1.49	74S472	4.95
74S114	.55	74S201	6.95	74S474	4.95
74S124	2.75	74S225	7.95	74S570	2.95
74S132	1.24	74S226	3.99	74S571	2.95
74S133	.45	74S240	2.20	74S573	9.95
74S134	.50	74S241	2.20	87S181	16.25
				87S185	16.95

7400

7400	.19	7483	.50	74172	5.95
7401	.19	7485	.59	74173	.75
7402	.19	7486	.35	74174	.89
7403	.19	7489	2.15	74175	.89
7404	.19	7490	.35	74176	.89
7405	.25	7491	.40	74177	.75
7406	.29	7492	.50	74178	1.15
7407	.29	7493	.35	74179	1.75
7408	.24	7494	.65	74180	.75
7409	.19	7495	.55	74181	2.25
7410	.19	7496	.70	74182	.75
7411	.25	7497	2.75	74184	2.00
7412	.30	74100	1.75	74185	2.00
7413	.35	74105	1.14	74189	2.99
7414	.49	74107	.30	74190	1.15
7416	.25	74109	.45	74191	1.15
7417	.25	74110	.45	74192	.79
7420	.19	74111	.55	74193	.79
7421	.35	74116	1.55	74194	.85
7422	.35	74120	1.20	74195	.85
7423	.29	74121	.29	74196	.79
7425	.29	74122	.45	74197	.75
7426	.29	74123	.49	74198	1.35
7427	.29	74125	.45	74199	1.35
7428	.45	74126	.45	74221	1.35
7430	.19	74128	.55	74246	1.35
7432	.29	74132	.45	74247	1.25
7433	.45	74136	.50	74248	1.85
7437	.29	74141	.65	74249	1.95
7438	.29	74142	2.95	74251	.75
7439	.79	74143	4.95	74259	2.25
7440	.19	74144	2.95	74265	1.35
7442	.49	74145	.60	74273	1.95
7443	.65	74147	1.75	74276	1.25
7444	.69	74148	1.20	74278	3.11
7445	.69	74150	1.35	74279	.75
7446	.69	74151	.55	74283	2.00
7447	.69	74152	.65	74284	3.75
7448	.69	74153	.55	74285	3.75
7450	.19	74154	1.25	74290	.95
7451	.23	74155	.75	74293	.75
7453	.23	74156	.65	74298	.85
7454	.23	74157	.55	74351	2.25
7460	.23	74159	1.65	74365	.65
7470	.35	74160	.85	74366	.65
7472	.29	74161	.69	74367	.65
7473	.34	74162	.85	74368	.65
7474	.33	74163	.69	74376	2.20
7475	.45	74164	.85	74390	1.75
7476	.35	74165	.85	74393	1.35
7480	.59	74166	1.00	74425	3.15
7481	1.10	74167	2.96	74426	.85
7482	.95	74170	1.65	74490	2.55

CMOS

4000	.29	4532	1.95
4001	.25	4538	1.95
4002	.25	4539	1.95
4006	.89	4541	2.64
4007	.29	4543	1.19
4008	.95	4553	5.79
4009	.39	4555	.95
4010	.45	4556	.95
4011	.25	4558	2.45
4012	.25	4560	4.25
4013	.38	4569	3.49
4014	.79	4581	1.95
4015	.39	4582	1.95
4016	.39	4584	.75
4017	.69	4585	.75
4018	.79	45151	12.95
4019	.39	4702	12.95
4020	.75	4724	1.50
4021	.79	74C00	.35
4022	.79	74C02	.35
4023	.29	74C04	.35
4024	.65	74C08	.35
4025	.29	74C10	.35
4026	1.65	74C14	.59
4027	.45	74C20	.35
4028	.69	74C30	.35
4029	.79	74C32	.39
4030	.39	74C42	1.29
4034	1.95	74C48	1.99
4035	.85	74C73	.65
4040	.75	74C74	.65
4041	.75	74C76	.80
4042	.69	74C83	1.95
4043	.85	74C85	1.95
4044	.79	74C86	.39
4046	.85	74C89	4.50
4047	.95	74C90	1.19
4048	.69	74C93	1.75
4049	.35	74C95	.99
4050	.35	74C150	5.75
4051	.79	74C151	2.25
4052	1.99	74C154	3.25
4053	.79	74C157	1.75
4060	.89	74C160	1.19
4066	.39	74C161	1.19
4068	.39	74C162	1.19
4069	.29	74C163	1.19
4070	.35	74C164	1.39
4071	.29	74C165	2.00
4072	.29	74C173	.79
4073	.29	74C174	1.19
4075	.29	74C175	1.19
4076	.79	74C192	1.49
4077	.59	74C193	1.49
4078	.29	74C195	1.39
4081	.29	74C200	5.75
4082	.29	74C221	1.75
4085	.95	74C244	2.25
4086	.95	74C373	2.45
4093	.49	74C374	2.45
4094	2.99	74C901	.39
4098	2.49	74C902	.85
4099	1.95	74C903	.85
14409	12.95	74C905	10.95
14410	12.95	74C906	.95
14411	11.95	74C907	1.00
14412	12.95	74C908	2.00
14419	7.95	74C909	2.75
14433	14.95	74C910	9.95
4502	.95	74C911	8.95
4503	.65	74C912	8.95
4507	1.25	74C914	1.95
4508	1.95	74C915	1.19
4510	.85	74C918	2.75
4511	.85	74C920	17.95
4512	.85	74C921	15.95
4514	1.25	74C922	4.49
4515	1.79	74C923	4.95
4516	1.55	74C925	5.95
4518	.89	74C926	7.95
4519	.39	74C927	7.95
4520	.79	74C928	7.95
4521	4.99	74C929	19.95
4522	1.25	74C930	4.95
4526	1.25	80C95	.85
4527	1.95	80C96	.95
4528	1.19	80C97	.95
4529	2.95	80C98	1.20
4531	.95		

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74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

74HC00	.59	74HC175	.99
74HC02	.59	74HC193	1.25
74HC04	.59	74HC194	1.04
74HC08	.59	74HC195	1.09
74HC10	.59	74HC238	1.35
74HC11	.59	74HC240	1.89
74HC14	.79	74HC241	1.89
74HC20	.59	74HC242	1.89
74HC27	.59	74HC243	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC251	.89
74HC74	.75	74HC257	.85
74HC75	.85	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC367	.99
74HC125	1.19	74HC373	2.29
74HC132	1.19	74HC374	2.29
74HC138	.99	74HC393	1.39
74HC139	.99	74HC4017	1.99
74HC151	.89	74HC4020	1.39
74HC153	.89	74HC4024	1.59
74HC154	2.49	74HC4040	1.39
74HC157	.89	74HC4049	.89
74HC161	1.15	74HC4050	.89
74HC164	1.25	74HC4060	1.29
74HC166	2.95	74HC4511	2.39
74HC174	.99	74HC4538	2.29

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT175	1.09
74HCT02	.69	74HCT193	1.39
74HCT04	.69	74HCT194	1.19
74HCT08	.69	74HCT195	1.29
74HCT10	.69	74HCT238	1.49
74HCT11	.69	74HCT240	2.19
74HCT14	.89	74HCT241	2.19
74HCT20	.69	74HCT242	2.19
74HCT27	.69	74HCT243	2.19
74HCT30	.69	74HCT244	2.19
74HCT32	.79	74HCT245	2.19
74HCT51	.69	74HCT251	1.09
74HCT74	.85	74HCT257	.99
74HCT75	.95	74HCT259	1.59
74HCT85	1.49	74HCT273	2.09
74HCT86	.79	74HCT299	5.25
74HCT93	1.29	74HCT367	1.09
74HCT125	1.29	74HCT373	2.49
74HCT132	1.29	74HCT374	2.49
74HCT138	1.15	74HCT393	1.59
74HCT139	1.15	74HCT4017	2.19
74HCT151	1.05	74HCT4020	1.59
74HCT153	1.05	74HCT4024	1.79
74HCT154	2.99	74HCT4040	1.59
74HCT157	.99	74HCT4049	.99
74HCT161	1.29	74HCT4050	.99
74HCT164	1.39	74HCT4060	1.49
74HCT166	3.05	74HCT4511	2.69
74HCT174	1.09	74HCT4538	2.59

VOLTAGE REGULATORS

TO-220 CASE PACKAGE

7805T	.75	7905T	.85
7808T	.75	7908T	.85
7812T	.75	7912T	.85
7815T	.75	7915T	.85
7824T	.75	7924T	.85

TO-3 CASE PACKAGE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49
7815K	1.39	7915K	1.49
7824K	1.39	7924K	1.49

TO-92 CASE PACKAGE

78L05	.69	79L05	.79
78L12	.69	79L12	.79
78L15	.69	79L15	.79

OTHER VOLTAGE REGS

78M05C	5volt	½amp	TO-220	.35
LM323K	5volt	3amp	TO-3	4.95
LM338K	Adj.	5amp	TO-3	3.95
78H05K	5volt	5amp	TO-3	9.95
78H12K	12volt	5amp	TO-3	9.95
78P05K	5volt	10amp	TO-3	14.95
UA78S40	FAIRCHILD		DIP	1.95

LINEAR

LM301	.34	LM567	.89
LM301H	.79	NE570	3.95
LM307	.45	NE571	2.95
LM308	.69	NE590	2.50
LM308H	1.15	NE592	.98
LM309H	1.95	LM709	.59
LM309K	1.25	LM710	.75
LM310	1.75	LM711	.79
LM311	.64	LM723	.49
LM311H	.89	LM723H	.55
LM312H	1.75	LM733	.98
LM317K	3.95	LM741	.35
LM317T	1.19	LM741N-14	.35
LM318	1.49	LM741H	.40
LM318H	1.59	LM747	.69
LM319H	1.90	LM748	.59
LM319	1.25	LM1014	1.19
LM320	see7900	LM1303	1.95
LM322	1.65	LM1310	1.49
LM323K	4.95	MC1330	1.69
LM324	.59	MC1349	1.89
LM329	.65	MC1350	1.19
LM331	3.95	MC1358	1.69
LM334	1.19	MC1372	6.95
LM335	1.40	LM1414	1.59
LM336	1.75	LM1458	.59
LM337T	1.95	LM1488	.69
LM337K	3.95	LM1489	.69
LM338K	3.95	LM1496	.85
LM339	.99	LM1558H	3.10
LM340	see7800	LM1800	2.37
LM348	.99	LM1812	8.25
LM350K	4.95	LM1830	3.50
LM350T	4.60	LM1871	5.49
LM358	.69	LM1872	5.49
LM359	1.79	LM1877	3.52
LM376	3.75	LM1889	1.95
LM377	1.95	LM1896	1.75
LM378	2.50	ULN2003	1.29
LM379	4.50	XR2206	3.75
LM380	.89	LM2877	2.05
LM380N-8	1.10	LM2878	2.25
LM381	1.60	LM2900	.85
LM382	1.60	LM2901	1.00
LM383	1.95	MPQ2907	1.95
LM384	1.95	LM2917	2.95
LM386	.89	LM3900	.59
LM387	1.40	LM3905	1.25
LM389	1.35	LM3909	.98
LM390	1.95	LM3911	2.25
LM392	.69	LM3914	3.95
LM393	1.29	LM3915	3.95
LM394H	4.60	LM3916	3.95
LM399H	5.00	MC4024	3.95
NE531	2.95	MC4044	4.50
NE555	.34	RC4136	1.25
NE556	.65	RC4151	3.95
NE558	1.50	LM4250	1.75
NE564	2.95	LM4500	3.25
LM565	.99	RC4558	.69
LM566	1.49	LM13600	1.49
		LM13700	1.45

H=TO-5 CAN, K=TO-3, T=TO-220

RCA

CA3023	2.75	CA3083	1.55
CA3039	1.29	CA3086	.80
CA3046	1.25	CA3089	2.99
CA3059	2.90	CA3096	3.49
CA3060	2.90	CA3130	1.30
CA3065	1.75	CA3140	1.15
CA3080	1.10	CA3146	1.85
CA3081	1.65	CA3160	1.19
CA3082	1.65	CA3183	.99

TI

TL494	4.20	75365	1.95
TL496	1.65	75450	.59
TL497	3.25	75451	.39
75107	1.49	75452	.39
75108	1.49	75453	.39
75110	1.95	75454	.39
75150	1.95	75491	.79
75154	1.95	75492	.79
75188	1.25	75493	.89
75189	1.25	75494	.89

BI FET

TL066	.99	LF347	2.19
TL071	.79	LF351	.60
TL072	1.19	LF353	1.00
TL074	2.19	LF355	1.10
TL081	.79	LF356	1.10
TL082	1.19	LF357	1.40
TL083	1.19	LF411	1.29
TL084	2.19	LF412	1.99

SPECTRONICS CORPORATION

EPROM ERASERS

	Timer	Capacity Chip	Intensity (uW/Cm²)	
PE-14		9	8,000	$83.00
PE-14T	x	9	8,000	$119.00
PE-24T	x	12	9,600	$175.00
PL-265T	x	30	9,600	$255.00
PR-125T	x	25	17,000	$349.00
PR-320T	x	42	17,000	$595.00

TRANSISTORS

2N918	.50	2N3772	1.85
MPS918	.25	2N3903	.25
2N2102	.75	2N3904	.10
2N2218	.50	2N3906	.10
2N2218A	.50	2N4122	.25
2N2219	.50	2N4123	.25
2N2219A	.50	2N4249	.25
2N2222	.25	2N4304	.75
PN2222	.10	2N4401	.25
MPS2369	.25	2N4402	.25
2N2484	.25	2N4403	.25
2N2905	.50	2N4857	1.00
2N2907	.25	PN4916	.25
PN2907	.13	2N5086	.25
2N3055	.79	PN5129	.25
3055T	.69	PN5139	.25
2N3393	.30	2N5209	.25
2N3414	.25	2N6028	.35
2N3563	.40	2N6043	1.75
2N3565	.40	2N6045	1.75
PN3565	.25	MPS-A05	.25
MPS3638	.25	MPS-A06	.25
MPS3640	.25	MPS-A13	.40
PN3643	.25	MPS-A55	.25
PN3644	.25	MPU-131	.99
MPS3704	.15	TIP29	.65
MPS3706	.15	TIP31	.75
		TIP32	.79

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL

ST=SOLDERTAIL

8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80

WW=WIREWRAP

INTERFACE

8T26	1.59
8T28	1.98
8T95	.89
8T96	.89
8T97	.89
8T98	.89
DM8131	2.95
DP8304	2.29
DS8833	2.25
DS8835	1.99
DS8836	.99
DS8837	1.65
DS8838	1.30

INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	3.95
ICM7207A	5.59
ICM7208	15.95

DATA AQC

ADC0800	15.55
ADC0804	3.49
ADC0809	4.49
ADC0816	14.95
ADC0817	9.95
ADC0831	8.95
DAC0800	4.49
DAC0806	1.95
DAC0808	2.95
DAC1020	8.25
DAC1021	7.95
DAC1022	5.95
MC1408L6	1.95
MC1408L8	2.95

EXAR

XR2206	3.75
XR2207	3.75
XR2208	3.75
XR2211	5.25
XR2240	3.25

9000

9304	.95
9316	1.00
9328	1.49
9334	2.50
9368	3.95
9401	9.95
9601	.75
9602	1.50
9637	2.95
96S02	1.95

SOUND CHIPS

76477	3.95
76488	5.95
76489	8.95
SSI-263	39.95
AY3-8910	12.95
AY3-8912	12.95
MC3340	1.49
SP1000	39.00

OPTO-ISOLATORS

4N26	1.00	MCA-7	4.25
4N27	1.10	MCA-255	1.75
4N28	.69	IL-1	1.25
4N33	1.75	ILA-30	1.25
4N35	1.25	ILQ-74	2.75
4N37	1.25	H11C5	1.25
MCT-2	1.00	TIL-111	1.00
MCT-6	1.50	TIL-113	1.75

VISA MasterCard

MICRODEVICES AT MICROPRICES

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DB25S RS232 FEMALE SOLDER CUP 2.25

DB25P RS232 MALE SOLDER CUP 1.90

BARGAIN HUNTERS CORNER

DYNAMIC RAMS

41256	256K	200ns	$13.95
4164	64K	200ns	9/$24.95

STATIC RAMS

HM6264	8Kx8	150ns	CMOS	$17.95
TMM2016	2Kx8	200ns		$3.25
HM6116	2Kx8	200ns	CMOS	$3.69

EPROMS

27128	16Kx8	250ns	$13.95
2764	8Kx8	450ns	$4.95
2732	4Kx8	450ns	$4.25

MATH CO-PROCESSOR CHIP

8087-3 INTEL $129.00

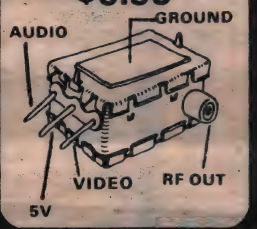
SPECIALS ENDS 4/30/85

RF MODULATOR (ASTEC UM1082)

QUANTITIES LIMITED

- PRESET TO CHANNEL 3
- USE TO BUILD TV-COMPUTER INTERFACE
- +5 VOLT OPERATION

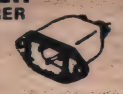
$6.95



EMI FILTER

- MAJOR MANUFACTURER
- LOW COST
- FITS LC-HP BELOW

$4.95



LINE CORDS

LC-2	2 CONDUCTOR	6 ft	.39
LC-3	3 CONDUCTOR	6 ft	.99
LC-HP	3 CONDUCTOR WITH STANDARD FEMALE SOCKET	6 ft	1.49
LC-CIR	CIGARETTE LIGHTER PLUG WITH 6 ft COILED CORD		2.95

MUFFIN FANS

4.68" SQUARE	14.95
3" SQUARE	14.95

RESISTORS

¼ WATT 5% CARBON FILM
ALL STANDARD VALUES
FROM 1 OHM TO 10 MEG OHM

50 PIECES SAME VALUE	.025
100 PIECES SAME VALUE	.02
1000 PIECES SAME VALUE	.015

CAPACITORS

TANTALUM

1.0µf	15V	.40	.47µf	35V	.50
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	560	50V	.05
22	50V	.05	680	50V	.05
25	50V	.05	820	50V	.05
27	50V	.05	.001µf	50V	.05
33	50V	.05	.0015	50V	.05
47	50V	.05	.0022	50V	.05
56	50V	.05	.005	50V	.05
68	50V	.05	.01	50V	.07
82	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	4.7	16V	.14
4.7	50V	.15	10	16V	.14
10	50V	.15	10	50V	.16
47	35V	.18	22	16V	.14
100	16V	.18	47	50V	.20
220	35V	.20	100	15V	.20
470	25V	.30	100	35V	.25
2200	16V	.60	220	25V	.30
			330	16V	.40
COMPUTER GRADE			550	16V	.42
			1000	16V	.60
			2200	16V	.70
44,000µf 30V 3.95			6000	16V	.85

BYPASS CAPS

.01 µf DISC	100/$6.00
.01 µf MONOLITHIC	100/$12.00
.1 µf DISC	100/$8.00
.1 µf MONOLITHIC	100/$15.00

EDGECARD CONNECTORS

S-100 ST	S-100	3.95
S-100 WW	S-100	4.95
72 PIN ST		6.95
72 PIN WW		7.95
62 PIN ST	IBM PC	4.95
50 PIN ST	APPLE	4.95
44 PIN ST		2.95
44 PIN WW		4.95

DIODES

1N751	5.1 VOLT ZENER	.25
1N759	12.0 VOLT ZENER	.25
1N4148	(1N914)SWITCHING	25/1.00
1N4001	50PIV 1A	12/1.00
1N4004	400PIV RECTIFIER	10/1.00
1N5402	200PIV 3A	.25
KBP02	200PIV 1.5A BRIDGE	.45
KBP04	400PIV 1.5A BRIDGE	.55
MDA801	50PIV 12A BRIDGE	1.39
MDA980-1	50PIV 12A BRIDGE	1.95
MDA980-2	100PIV 12A BRIDGE	2.25
VM48	DIP-BRIDGE	.35

LED DISPLAYS

HP5082-7760	CC	.43"	1.29
MAN-72	CA	.3"	.99
MAN-74	CC	.3"	.99
FND-357(359)	CC	.375"	1.25
FND-500(503)	CC	.5"	1.49
FND-507(510)	CA	.5"	1.49
TIL-311 4x7 HEX W/LOGIC		.270"	9.95

HARD TO FIND "SNAPABLE" HEADERS

Can easily be snapped apart to make any size header, all with .1" centers

1x40	STRAIGHT LEAD	1.99
1x40	RIGHT ANGLE	1.49
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS

SPACED AT .1" CENTERS
IDEAL FOR DISK DRIVES
OR ANY .1" HEADER

5/1.00

DIP SWITCHES

4 POSITION	.85
5 POSITION	.90
6 POSITION	.90
7 POSITION	.95
8 POSITION	.95
10 POSITION	1.29

36 PIN CENTRONICS

IDCEN36	RIBBON CABLE MALE	8.95
IDCEN36/F	RIBBON CABLE FEMALE	8.95
CEN36	SOLDER CUP MALE	7.95

HEAT SINKS

TO-220	SCREW ON	.35
TO-220	CLIP ON	.35
TO-3	SCREW ON	.95
TO-220	INSULATOR	10/1.00
TO-3	INSULATOR	10/1.00

SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
BCD OUT 10 POSITION 6 PIN DIP		1.95

DIFFUSED LEDS

		1-99	100-up
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.18	.15
JUMBO YELLOW	T1¾	.18	.15
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09
MINI GREEN	T1	.18	.15
MINI YELLOW	T1	.18	.15
RECT RED	2x5mm	.25	.22
RECT GREEN	2x5mm	.30	.27
RECT YELLOW	2x5mm	.30	.27

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.99	.99	.99	1.69	1.89	1.89	1.99	2.49	2.99
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

D-SUBMINIATURE

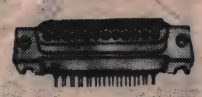
DESCRIPTION		ORDER BY	CONTACTS				
			9	15	25	37	50
SOLDER CUP	MALE	DBxxP	1.19	1.59	1.90	2.85	4.25
	FEMALE	DBxxS	1.50	1.85	2.25	3.90	5.25
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.65	2.20	3.00	4.83	---
	FEMALE	DBxxSR	2.18	3.03	3.00	6.19	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.95	3.90	4.75	6.95	---
	FEMALE	IDBxxS	3.25	4.29	5.25	7.95	---
HOODS	BLACK	HOOD-B	---	---	.99	---	---
	GREY	HOOD	.89	.99	.99	1.09	1.19

MOUNTING HARDWARE-$1.00

FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

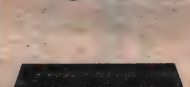
IDB37S

DB37S



DB25SR

TEXTOOL ZERO INSERTION FORCE SOCKETS AND RECEPTACLES



SCREWDRIVER CLAMP ECONO ZIF

LEVER CLAMP ZIF SOCKET

WW RECEPTACLES ZIF RECEPTACLE

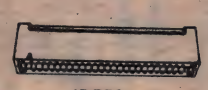
TYPE	CONTACTS				
	14	16	24	28	40
ECONO ZIF	---	4.95	6.75	7.75	9.95
ZIF SOCKET	4.95	4.95	5.95	6.95	9.95
ZIF RECEPTACLE	8.25	8.75	9.75	10.50	12.75

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

ORDERING INSTUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED. EXAMPLE: A 10 PIN RIGHT ANGLE HOLDER STYLE WOULD BE IDH10SR

IDH20W



IDE50

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.83	7.30
16	.28	2.50	1.00	8.80
20	.36	3.20	1.25	11.00
25	.45	4.00	1.32	11.60
26	.46	4.10	1.32	11.60
34	.61	5.40	1.65	14.50
40	.72	6.40	1.92	16.80
50	.89	7.50	2.50	22.00

JDR Microdevices
1224 S. Bascom Avenue, San Jose, CA 95128
800-538-5000 • 800-662-6279 (CA) • (408) 995-5430
FAX (408) 275-8415 • Telex 171-110

RETAIL STORE - 1256 S. BASCOM AVENUE
HOURS: M-W-F, 9-5 TU-TH, 9-9 SAT, 10-3

PLEASE USE YOUR CUSTOMER NUMBER WHEN ORDERING

TERMS: Minimum order $10.00. For shipping and handling include $2.50 for UPS Ground and $3.50 for UPS Air. Orders over 1 lb. and foreign orders may require additional shipping charges - please contact our sales department for the amount. CA. residents must include 6% sales tax. Bay Area and LA residents include 6½%. All merchandise is warranted for 90 days unless otherwise stated. Prices are subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sale.

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IBM PC PROTOTYPE CARD WITH DECODING CIRCUITRY $29.95

WIRE WRAP PROTOTYPE CARDS

FR-4 EPOXY GLASS LAMINATE WITH GOLD-PLATED EDGE-CARD FINGERS

IBM-PR2

IBM

BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

IBM-PR1	WITH +5V AND GROUND PLANE	$27.95
IBM-PR2	AS ABOVE WITH DECODING CIRCUITRY	$29.95

S-100

P100-1	BARE - NO FOIL PADS	$15.15
P100-2	HORIZONTAL BUS	$21.80
P100-3	VERTICAL BUS	$21.80
P100-4	SINGLE FOIL PADS PER HOLE	$22.75

APPLE

P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

GENERAL PURPOSE

22/44 PIN EDGE-CARD (.156" SPACING)

P441-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P441-3	VERTICAL BUS 4.5" x 6.0"	$13.95
P441-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P442-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P442-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P442-4	SINGLE FOIL PADS 4.5" x 9.0"	$13.50

36/72 PIN EDGE-CARD (.1" SPACING)

P721-1	BARE - NO FOIL PADS 4.5" x 6.0"	$9.45
P721-3	VERTICAL BUS 4.5" x 6.0"	$13.25
P721-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P722-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P722-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P722-4	SINGLE FOIL PADS 4.5" x 9.0"	$15.15

BARE GLASS BOARDS

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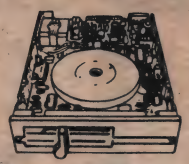

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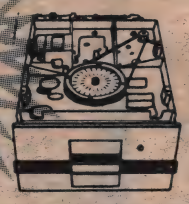

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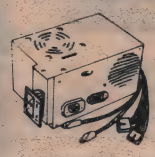

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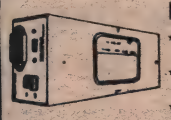

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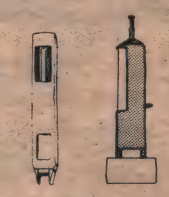

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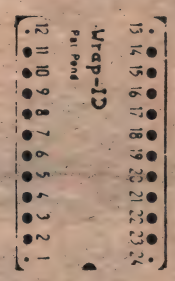

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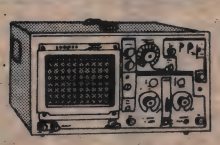

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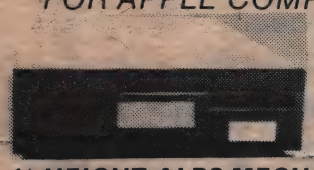

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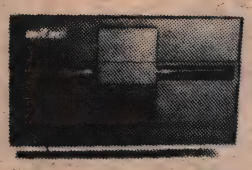

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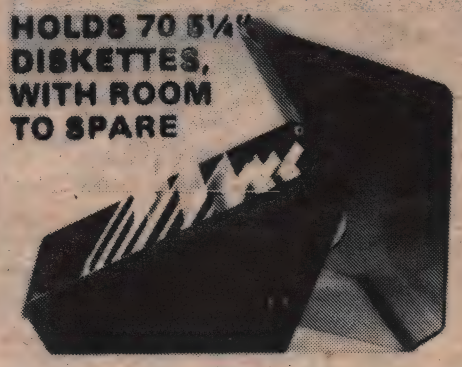

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Rapping with Racter
Continued from page 119

thralling. But Napoleon was inflamed while Diane sipped tepid seltzer. She and Napoleon hummed about their apartment, truck and television.

Finally, it seemed wisdon came as easily to Racter as story writing. When questioned on the subject, Racter quipped, "If 'I am wise' occurred to a fool, he might think it was folly." He then riddled, "How are dogs like babies? Their wisdom and their folly are suddenly spooky." Doesn't this sort of response from a computer make you feel spooked?"

Bugs and Fixes

The first version we received from INREC contained one conspicuous bug. Certain irregular verbs were contracted or negated incorrectly. For example, aren't and won't came up in the interactive conversation conjugated as arenn't, and willnn't. Am not was sometimes constructed as amnn't. However this didn't occur in the story or joke mode, and was corrected in the interactive mode with the second release.

The only other problem we encountered was that the program hung up once or twice in the middle of a piece of lengthy, giddy discourse. However, this only occurred in the early release, and may have been connected with the fact that a giddy, exploratory 3 year old had been visiting the scene earlier, and had given a few lethal tugs to the IBM's power cord with Racter nested helplessly in the closed B drive. Thus the problem was probably related to "zapped" diskettes, and not to fatal errors of the sort that were noted previously on the PCjr.

Conclusion

Overall, and speaking just a little seriously, Racter is entertaining, playful and prolific. He'll write stories (strange stories, but stories nonetheless), and will discuss many subjects - when he's in the mood. (We once saw him refuse to log off!) Although he may not always supply the heart to heart talk mentioned earlier, he is full of surprises, and good company as well (we've seen people start the program, and then become engrossed for literally hours at a time).

Is Racter as exciting a piece of software as his reputation suggested? Does he deserve a place of honor in the recreational computing hall of fame between your Microsoft Flight Simulator and your Gommoku package? We think so. That's because Racter is a truely ingenious, innovative program. He really does "cook by himself," producing conversation by the screenfull. His responses to questions can be consistent, and yet mischievously unpredictable. We found Racter to be lots of fun, and occasionally thought-provoking, especially when he conjures up a particularly clever response such as "Man is infinitely more complicated than his thought." Wouldn't you say the same of a computer? ●

Racter — Another View

When we received the Racter program I was most anxious to try it out, but first we sent it to a reviewer who is in the artificial intelligence lab at a large university. Our reviewer sent the program back to us with a message that was quite cryptic. "If there is artificial intelligence, sooner or later someone had to invent artificial stupidity, this is it!"

Well, I could not help but rush to my computer and try Racter for myself. If artificial stupidity existed I wanted to know about it. I do not agree, Racter is no stupider than Eliza or any of the other programs of the same ilk, he just has a better sense of humor.

I did spend some time with Bill Chamberlain discussing Racter, but it was at a cocktail party, celebrating the publication of the Digital Delli. He is a fine fellow but we never got around to the question I had to ask him "How did you keep Racter on one subject long enough to write a book?" What Racter does after talking "around any subject" is to end the conversation leaving you hanging. Perhaps my conversations bore him and Bill's do not.

In any event we have not heard the last of Racter and I hope he is improved. Just another example of Veit's Law: "Nothing ever works right until Revision E." ●

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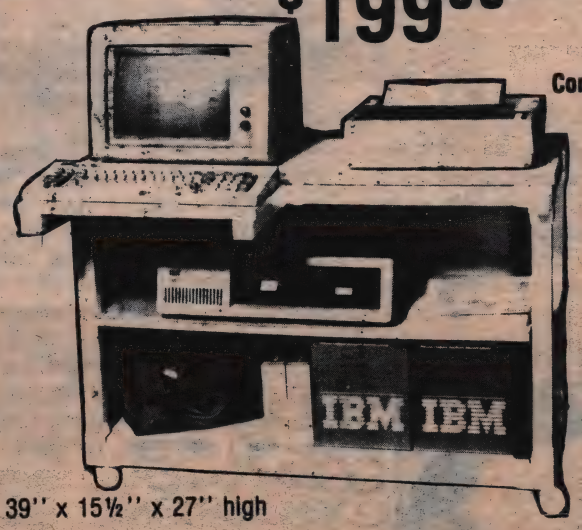

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Continued from page 108

the RAMdrive step in between, the two hard disk drives are not functioning at the same time! Therefore, I now feel a lot safer!

I will grant you readers that the internal hard disk drive could still crash overnight and I could loose the client's updated files that were transferred. BUT! This is not the serious problem that I did have. I now have a working second drive that I could use immediately to obtain the updates again from the clients and this would be for just that one time, not 10 or more days while repairs might be necessary. I could then use the backup utility with diskettes for this repair period but I would not need the "make shift" floppy disk system as before. Best of all, do the readers know how long it takes to restore a hard disk from diskettes? Now, when the repaired disk was put back into operation, I can copy from the external disk to RAMdrive and from RAMdrive to the repaired internal disk in minutes. Besides, I have peace of mind that I am not exposed to the big crash problem!

Hard disks are not a luxury in business usage! Hard disks are no longer expensive! Use them for both business and backup purposes! They are less expensive then their alternatives -- tape streamers, removable hard disks, and diskettes with the backup utility with time included!

If I have sold the readers on this idea, I would like to go into a little more detail. First, I decided I should protect both of my computer's hard disk drives. I purchased a dual drive cabinet with power supply but without a fan. I did not want the noise of the fan and I did not think that it was required because I will not be using both drives at the same time and I usually will not be operating either drive for any extended period of time per session. The cabinet power supply has a built in power switch and I added a DPDT switch on the front panel between the two drives. I wired this switch in series with the 12 and 5 volt DC voltages to the two drives. If the switch is in the right position the right drive would receive the two DC voltages. When the switch is in the left position the left drive would receive the DC voltages. Therefore, the two drives cannot be operated at the same time. The cabinet master switch would still control the external hard disk drive usage.

Second, I assembled two sets of ribbon cables and I made them six feet long. This allows placing the dual drive cabinet on a shelf above the two computers where the switches can be easily reached. Each cable set requires one 20-pin and one 34-pin cable with one edge-connector on one end of the ribbon wire and a female-socket on the other end. Ribbon wire cables are a lot easier to assemble then the old solder pot connectors.

Third, I purchased two 10 megabyte hard disk drives - one for the H/Z-100 and one for the Z-100-PC. They are alike which gives me redundancy and interchangeability if I should ever need this feature.

Fourth, I prepared a diskette to use in the A: drive with a AUTOEXEC.BAT file that would command the computer to do the following:

- Clock
- Assign internal hard disk model partition
- Setup RAMdrive
- Copy Modem partition to RAMdrive using "pathname" to limit the copy function to just the client's updated files (/V switch with copy for verification)
- Copy RAMdrive to external modem partition from RAMdrive using /V switch and "pathname" for the certain client's file.

These .BAT files can be repeated for as many client's updated files as the user is working with by using different "pathnames" for each client. Thus, the complete backup procedure is automatic, can be done in minutes without restricting the user from doing other things, and eliminates the chances for human errors!

This hard disk drive backup idea can be used with nearly any make of computer. It is not limited to Heath/Zenith computers. The external hard disk drive is easy to add. It does not require any special computer hardware or software knowledge. The cables can be purchased assembled if the reader does not want to do the assembly work. It is easy to do however.

Best of all, I can now sleep nights without worrying that I will ever have that crashed disk problem like the one I had! I know that some of the readers and I can both think of other things that could happen. BUT! That is what life is about. One step at a time!

Happy Heath/Zenith computing until our next article. Do not forget to send me your letters of ideas, Thank you. ●

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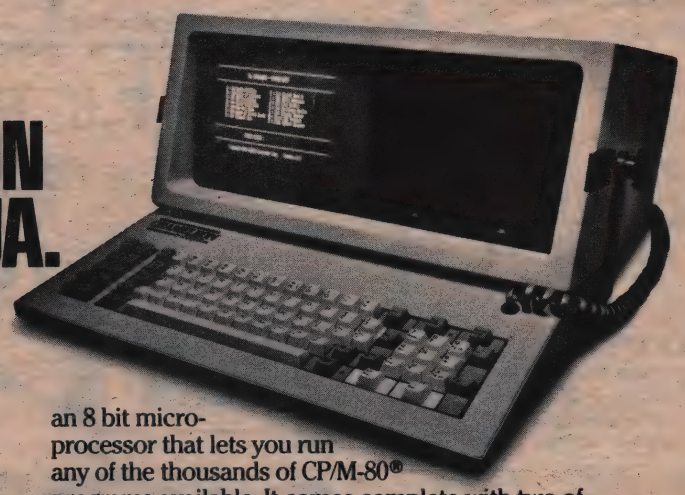

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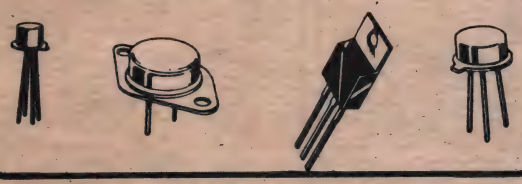

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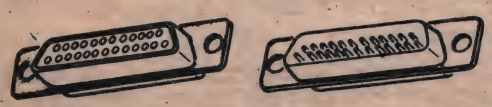

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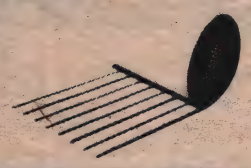

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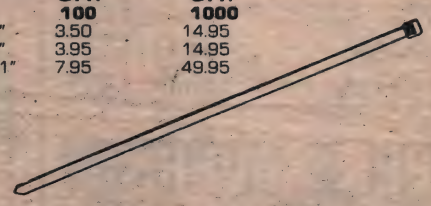

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Murder By The Dozen Game Sheet

by Cheryl Peterson

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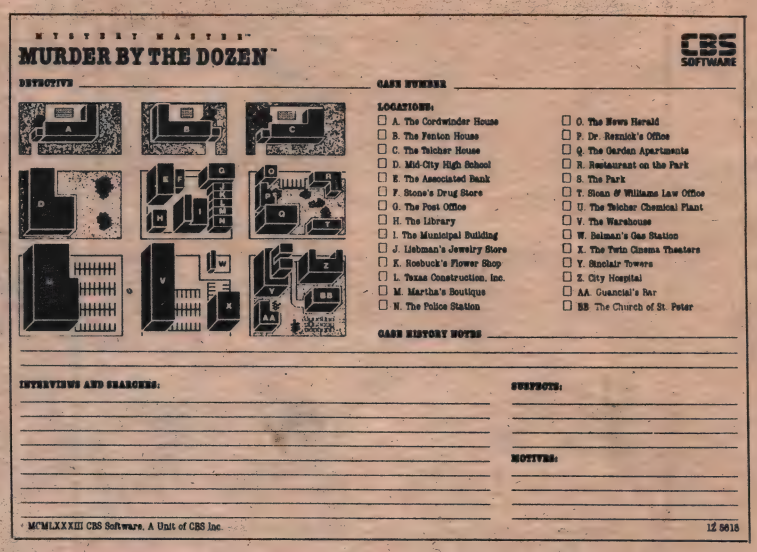
Continued on page 134



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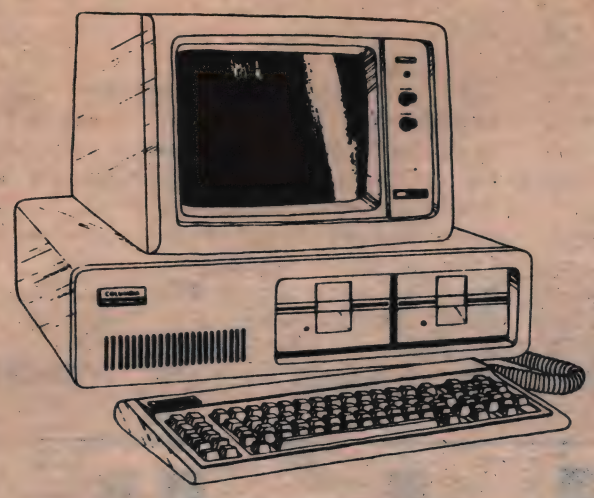

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Murder By The Dozen
Continued from page 132

vestigation; a good detective is both quick and thorough.

Any good mystery needs clues, and this one is no exception. So the package includes a book with 700 clues, numbered 1 to 700 and mixed up at random. You don't know which clues go with which of the twelve crimes, until you do some looking around.

The detective manual gives you instructions on how to conduct an investigation. It also includes the opening outline for each crime. For instance, take the case of Claude Finley, City Clerk. Poor Claude was crossing the street when a green Ford ran him down. Three witnesses say it was deliberate. Frank Conners from the News Herald says he has information relating to the case.

You start out in front of the municipal building, where the accident occurred with a list of three witnesses and the added information that Claude worked in city Councilman Peter Johnson's office. To win, you have to identify the murderer and have one solid piece of evidence to prove your case. Sounds easy, right?

The witnesses havegone. If you want to question them, you'll have to go to two different locations; two work at the library, one at the gas station. While you're here at the municipal building you might want to question the councilman or his secretary. Or you might want to check city records or search the councilman's office.

At each location in the city, you are given the chance to question three people or to check three pieces of physical evidence (search an area or read a report). You can question any or all of the people there. Each time you choose a person to interview, a group of clue numbers appears on the screen. Some will contain valuable information, some will just consume your time. Be careful who you talk with if you're in a hurry. Some people can take forever to tell you nothing. Clues are also listed by number when you choose to look around or examine a piece of evidence. Searching a closet may give you just the clue you need to put the pieces together or it could be just a waste of time.

Look up each clue in the book. When more than one detective is playing, this means that the others can't see the information you get. Hopefully no one cheats by remembering someone else's clue numbers. The computer remembers whether or not you've accessed certain clues that are vital to solving the crime. If you haven't, it will give a shoddy detective rating so lets not cheat here folks.

There are 28 locations in town, including the police station. Autopsy and lab reports will be available back at the station, when they're ready. You can also have the computer search through records for more information on suspects. At the station you can talk to other police officers or call your stool pigeon and see what he knows.

When you think you've solved the crime, you look up the winning answer provided in the solutions book. In most cases, just knowing who committed the murder isn't enough to win. Once you've looked, the game is over for you. So be sure you're right. If more than one person is playing, then you must explain your solution to the others before you look up the answer. If you're wrong the others keep playing (and you look foolish.)

Although this game is mostly one of looking up clues, there are a few graphics, all of which are well done. An on-screen map of the city is available if you want it whenever you change locations. The notepads provided for the sleuths also have a city map on them. It's a good idea to plan your route ahead, trips back and forth across town can waste valuable time.

I found the opening to be a bit redundant in single player mode. Since the case histories are listed in the detective manual, it seems a shame to wait while the details of the crime you are investigating are typed out on the screen. The sound effect that accompanies it (resembling a teletype clacking) is well done, though. In multiple player mode, this is a very useful feature that prevents everyone from having to pass around the detective manual. Unfortunately, the program doesn't ask the number of players until after the case history has been presented.

This is an excellent game for mystery fans. Unlike a novel, this lets you choose who to question and where to go in search of clues. You do not have the opportunity to pick the questions to ask the subject;

Continued on page 135

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Assembly Language Programming for the Apple II

by Don Lancaster

The Assembly Language Programming for the Apple II is continued from February, 1985, page 60. This material was omitted from the March, 1985 issue.

This article is excerpted from Assembly Cookbook For The Apple II/IIe ($12.95), published by Howard W. Sams & Co., Inc.

By special arrangements with Don Lancaster & Howard W. Sams & Co., Inc.

A hook source code line will start with the defining label, followed by the pseudo-op EQU, followed by the absolute address. Later on, operands in the program can refer to these hooks. It is best to define the hooks *before* you use them although a good assembler will find a label anywhere in the source code.

One exception in "new" EDASM: If you specifically want to force an absolute address that references page zero, your EQU must *follow* the first operand label reference. Otherwise, you will get page zero addressing, rather than absolute addressing. The need for an absolute address from $0000 to $00FF is very rare, but can solve some timing problems.

```
72 ;                    *** HOOKS ***.
73  SKP1
74 COUT     EQU  $FDED      ; OUTPUT CHARACTER VIA HOOKS
75 HOME     EQU  $FC58      ; CLEAR SCREEN
76 KBDSTR   EQU  $C010      ; KEYBOARD RESET
77 INIT     EQU  $FB2F      ; INITIALIZE TEXT SCREEN
78 KEYIN    EQU  $FD1B      ; READ KEYBOARD
79 PRBL2    EQU  $F94A      ; PRINT X BLANKS
80 SETINV   EQU  $FE80      ; SET INVERSE SCREEN
81 SETNORM  EQU  $FE84      ; SET NORMAL SCREEN
82 STRP2    EQU  $EB        ; POINTER TO ASCII STRING
83 WAIT     EQU  $FCA8      ; TIME DELAY SET BY ACCUMULATOR
84          SKP3
```

Above are some hooks...

For instance, we see that the label WAIT is defined as absolute address $FCA8, which is the Apple II location for a monitor delay subroutine.

Hooks may be defined as an 8-bit value or a 16-bit value. An 8-bit value is interpreted by EDASM as a page zero address. A value of four hex bytes, or 16 bits is interpreted by EDASM as an absolute address. The operand can modify the addressing mode by adding a comma for indexed addressing, or including parentheses for indirect addressing modes, and so on.

Hooks may also be used to set aside locations on page zero for special use by your program, and can also be the interconnections between your

Continued on page 136

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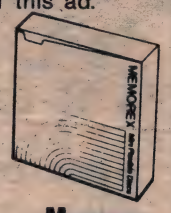

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Murder By Dozen

Continued from page 134

the program assumes all detectives will be able to get the same amount of information from each suspect or witness. Nonetheless, this is an enjoyable game that can easily occupy many hours of your time.

I believe the authors intended for the game to be educational, as well. I can certainly see where the program will help develop logical thinking and an analytical approach to problems. Each crime has only one solution, although it can sometimes be reached in more than one way. Once each crime has been solved though, that's it. This gives the program a limited lifetime as far as each detective goes. At $35 it's just a little expensive. However, you might look for it at a discounted price. There is certainly $25 worth of program here. ●

Assembly Language
Continued from page 135

program and other modules, possibly even in other languages. In line 82, STRP2 is a string pointer we have defined and set aside on page zero for use by this program module. Note that the same label can point to the *next* location as well, by using STRP2 + 1 and doing operand arithmetic.

Three gotchas. Be sure to use the "$" sign for hex addresses. Do not use a "#" symbol when defining a hook. The "EQU" says that you are defining a value. Finally, all EDASM page zero locations *must* be pre-defined with hooks before they are used.

Summing up. . .

USING "EQU" HOOKS

DON'T forget the "$" sign in front of hex addresses.

DON'T use the "#" symbol, as EQU says nearly the same thing.

DO pre-define all EDASM page zero addresses using 8-bit hook values.

As review, do you remember the difference between and EQU and a DFB? Well. . .

EQU means *equate* and pre-defines an address before it is used.

DFB means *define* and enters an in-place value into the object code.

Thus. . .

EQUs come BEFORE any real op codes.

DFBs appear DURING or AFTER any real op codes.

One exception: On "new" EDASM, absolute 16-bit references to page zero locations must have their EQU *following* their first use. The need to force an absolute address from $0000 to $00FF is very rare, but this rule lets you do it.

What we say for DFBs goes double for DDBs and DFWs. Why?

Any time you use an EQU, you have to match the word size and the instruction mode to what you need. For instance, on an 8-bit value, such as WNDTOP EQU $20, a LDA WNDTOP will load the accumulator from page zero memory location $0020. On the other hand, a LDA#WNDTOP will put the immediate value hex $20 into the accumulator.

As 16-bit examples, say you use a DISK EQU $C08C. A command of LDA DISK will load the accumulator from absolute location $C08C. A command of LDA DISK,X will load the accumulator from the sum of what is in the X index register and absolute location $C08C. Typically, there will be a $60 in the X register for slot number six, and the LDA DISK,X will access absolute location $C0EC, which reads the diskette if things have been set up properly. This use of indexed instructions is the usual way to set up slot independent code.

The rule is this. . .

ALWAYS match the size of the EQU to the size of the needed 8-bit or 16-bit value or address.

There is one sneaky way you can split up a 16-bit EQU into two 8-bit pieces. This is done with a ">" or a "<" in the operand.

For instance, say you want to take a 16-bit previously EQU'd address and put it into a pair of 8-bit locations on page zero. Here is how to do it. . .

Continued on page 138

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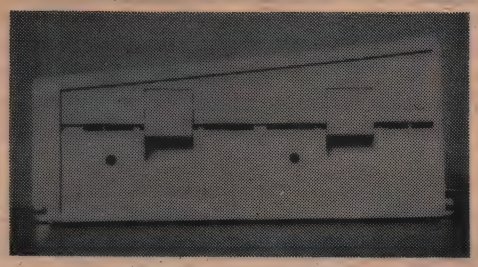

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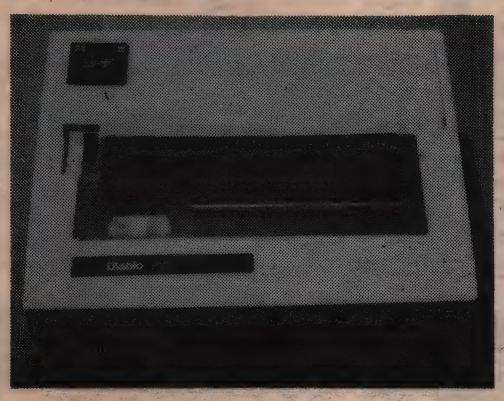

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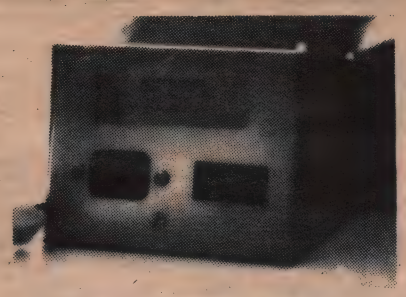

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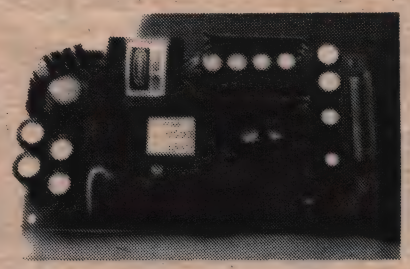

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Assembly Language
Continued from page 136

```
LDA >ADDRESS
STA POINTER
LDA <ADDRESS
STA POINTER+1
```

What this tells you to do is take the bottom half of a 16-bit address and store it in a page zero location called POINTER. Then take the top half of the 16-bit address and store it in the next available location, found by adding one to POINTER.

Alternately, you could store the bottom half in POINTLO and the top half in POINTHI. Remember that most addresses in most 6502 uses are *backward*, with the low 8-bit or position address first, and the high 8-bit or page address following.

Here's the rule on the "pick half" commands.

> A ">" in an EDASM operand says to pick and use the lower eight bits of a 16-bit value.
>
> A "<" in an EDASM operand says to pick and use the upper eight bits of a 16-bit value.

Note that the arrow or caret points to the half of the 16-bit word you want to use. Other assemblers will most likely have some similar way to split up 16-bit words into 8-bit pieces.

Your EQU hooks should normally be put in alphabetical order, unless some other logical grouping makes more sense for what you are doing.

Constants

Some programmers like to put all their EQUs into one long list. Others like to put all the 8-bit stuff in one pile, and the 16-bit values into another. I prefer to put all the EQU *addresses* into one combined hook list.

Then, on the same page, if you have any EQUs that are fixed constants or other predefined but non-address values, you add a second list for these.

For instance, you might like to add *textfile commands*, such as a label "B" for backspace, "F" for formfeed, "P" for a flashing screen prompt ($60), "G" for a bell or "gong," and so on.

Here's a ferinstance. . .

```
85 ;                    *** TEXTFILE COMMANDS ***
86                SKP1
87 B              EQU   $88       ; BACKSPACE
88 C              EQU   $8D       ; CARRIAGE RETURN
89 D              EQU   $84       ; DOS ATTENTION
90 L              EQU   $8A       ; LINEFEED
91 P              EQU   $60       ; FLASHING PROMPT
92 X              EQU   $00       ; END OF MESSAGE
93                PAGE
```

We will see how to use these constants later in the ripoff modules that involve themselves with printing text. We'll see then that you can use a DFB C,L instead of a DFB$8D,$8A to put a carriage return and a skipped vertical space into a message. The label method is obviously easier to type and saves looking up the same ASCII command value a dozen times.

As another use of constants, consider a musical note program. Here you can define labels of "A1," "A1#," "B1," and so on, or something similar. The assembler can then substitute pitch values directly for the labels. But, don't forget that a single letter label of "A" is a reserved no-no. So are "X" and "Y" on "new" EDASM.

At any rate, all of the EQUs should go on one page if they will fit. The address EQUs should go first and be called hooks, while the value EQUs should go second and be called constants.

The EMPTY SHELL.SOURCE ripoff module includes hundreds of the most popular EQUs already built into the source code and ready for your use without any looking up or scrounging around. What you do is decide which EQUs you *do not* want and then eliminate all but the good guys.

Big Lumps

At long last, in tenth place

Continued on page 140

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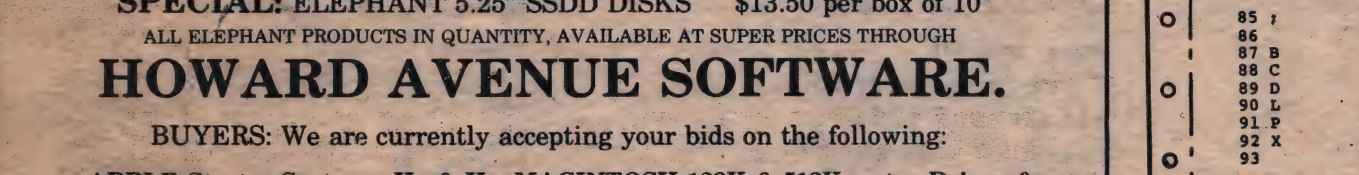
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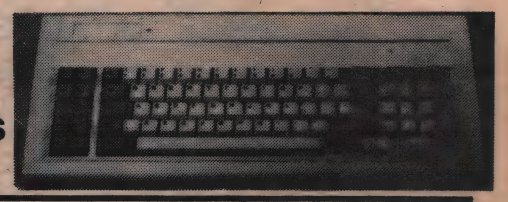

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Assembly Language
Continued from page 138

of our assembler's source code structure, we are ready to start with the "real" program. This involves the op codes that the assembler is to use to put together some object code for us.

What you enter here, of course, depends on what you want your program to do. Regardless of how big or how small the program is, it is convenient to break the code up into three groups, which we will call the *big lumps*, the *little lumps*, and the *crumbs*.

The size of each depends on the overall size of your program. If you are writing a simple support module, the big lumps will be the actual program code, the little lumps will be the support subroutines, and the crumbs will be any sub-subs or short file entries. You can have any number of lumps of any size.

On a very large program, the big lumps will be the supervisory or high-level control code, the little lumps will be the code modules that do each individual needed task, and the crumbs will be the subroutines that do all the grunge work.

Any short or compact files that are not often changed might also be included as little lumps or crumbs. We'll have room for big files later in our structure.

Normally, it is a good idea to have your program do something on its very first address. The reason for this is that if you BRUN something off a disk, the disk will try to execute the first byte in the code as an instruction. So, you usually start with the high level big-lumps code, follow this with the lower level little-lumps code, and then work your way down to the detail or crumbs code.

Any support files are best split up so that short and rarely changed files immediately follow the module that uses them, and such that major files go on the end.

Saying it again. . .

The first byte in a program should normally be executable code.

The usual way to arrange a program is heavy instructions first, then medium instructions second, and details third.

Short and rarely changed stashes normally follow the module that uses them.

Long files normally go at the end.

Now, of course, anything goes in machine language. So, you are free to change and rearrange things any way you like. But, recognize that this "{big lumps}—{little lumps}—{crumbs}—{files}" structure works well for most uses. Use it unless you have a good excuse not to.

Should you absolutely have to start with a file rather than code, put a 3-byte jump at the beginning so that a BRUN command can bypass the data and get to the running commands.

Here's some good practice. .

A code module ideally should have only one entry point and only one exit means.

Ideally, the entry point should be the first byte of the code module.

There are times and places where you may want to violate this rule, but it is generally a good idea to keep things in a modular order, with entry and exit to various modules at expected and reasonable points.

Subroutines are ideal modules, because they meet

Continued on page 142

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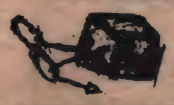

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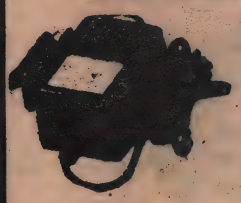

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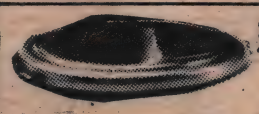

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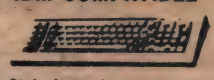

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Assembly Language
Continued from page 140

this need of "single entry at the top," and "obvious exit on return." In fact, it is a good idea to use subroutines even if the code is only needed or used in one place of a program.

The organizing power of a subroutine is even greater than its code shortening abilities. .

Subroutines are nearly ideal code modules and should be used even if what they do is needed only at one point in the program.

What single subroutines do for you is keep the crumbs out of the flow of the big-lumps code. Each detail sub can be changed without having to reassemble and retest and redebug the high level code, provided you separate everything off into bite sized chunks ahead of time.

Two exceptions. First, if speed is everything, don't use subroutine calls and returns inside that part of the code that has to run the fastest. And secondly, it may be necessary to sometimes have two or more entry points into a single subroutine, such as for a "cold" or "warm" entry, or whatever.

There is really no difference between how you put the big lumps, the little lumps, and the crumbs into your source code. What could be a big lump for one program could be nothing but a crumb in another. In general, you put down a title, some user documentation, and then the "real" op codes.

The best examples of this appear in the ripoff modules later in the book. You might want to scan these at this time, looking for examples of how to handle these three structural parts to your source code.

Here is an example of what to look for. . .

```
181 ;                  *** IMPRINT MODULE ***
182          SKP2
183 ;        THIS MODULE UNPOPS THE STACK TO FIND THE
184 ;        IMBEDDED STRING.  IT OUTPUTS ONE CHARACTER
185 ;        AT A TIME TILL AN $00 MARKER IS FOUND. THEN
186 ;        IT JUMPS BACK TO THE CALLING PROGRAM JUST
187 ;        BEYOND THE STRING.
188 ;
189          SKP2
190 IMPRINT STX  XSAV2      ; SAVE REGISTERS
191          STY  YSAV2      ;
192          STA  ASAV2      ;
193          SKP1
194          PLA             ; GET POINTER LOW AND SAVE
195          STA  STRP2      ;
196          PLA             ; GET POINTER HIGH AND SAVE
197          STA  STRP2+1    ;
198          SKP1
199          LDY  #$00       ; NO INDEXING
200 NXTCHR2  INC  STRP2      ; INCREMENT TO NEXT ADDRESS
201          BNE  NOC2       ; SKIP IF NO CARRY
202          INC  STRP2+1    ; INCREMENT HIGH ADDRESS
203 NOC2     LDA  (STRP2),Y  ; GET CHARACTER
204          BEQ  END2       ; IF ZERO MARKER
205          JSR  HOOK2      ; FOR SPECIAL EFFECTS ONLY
206          JSR  COUT       ; PRINT CHARACTER
207          JMP  NEXCHR2    ; BRANCH ALWAYS
208          SKP1
209 END2     LDA  STRP2+1    ; RESTORE PC LOW
210          PHA             ;
211          LDA  STRP2      ; RESTORE PC HIGH
212          PHA             ;
213          LDX  XSAV2      ; RESTORE REGISTERS
214          LDY  YSAV2      ;
215          LDA  ASAV2      ;
216 HOOK2    RTS             ; AND EXIT
217          SKP4
```

Don't worry too much just yet on what this code is doing. More details will follow later. What you want to look for is how you take something you want done, call it a big lump, a little lump, or a crumb, and then write source code for it. The source code for this portion of what you are doing should start with a title and an explanation, followed by the actual code. Lots of white space should be put wherever it will do the most good. Page breaks can be used to split things up into reasonable or logical chunks.

If we look more closely at this source code, the sequential lines become obvious. Each line has a number, label, op code, operand, and comment field, except for those lines that are pure comment and start with a semicolon. Labels are not used in every field. But we clearly see how the NXTCHR2 label identifying line 200 is used as an operand in line 207 to find this particular line. This is how the assembler will calculate relative branches for us.

We see how operands can either be values, such as $00, or labels, such as COUT. We also see how operand labels identify locations defined or equated elsewhere in the program, such as XSAV2, which is a temporary stash for the X-register.

You can find the addressing mode used for each line by *carefully* studying the punctuation in the operand. The "#" gives us a value. STRP2 is a page zero address. COUT is an absolute address, because we happpen to have previously EQU'd these to separate 8- and 16-bit address values. The parentheses in (STRP2),Y call for Apple's powerful indirect indexed addressing, which is used to hit any slot in the entire address space. We see how a label always follows a branch command, and how that label points to another nearby line in the code. The assembler can automatically find these labels, even if the source code gets

Continued on page 144

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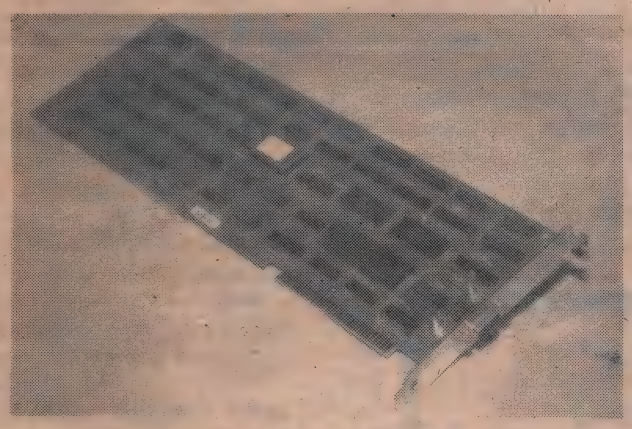

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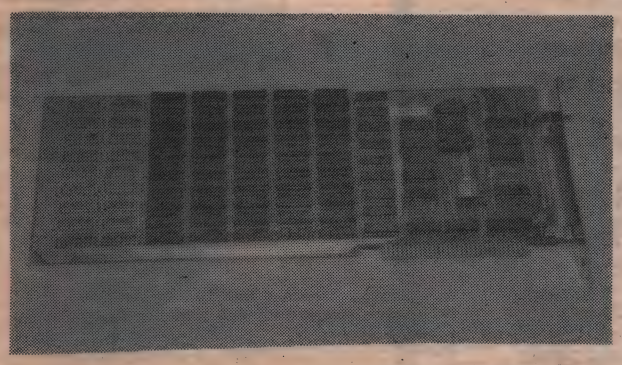

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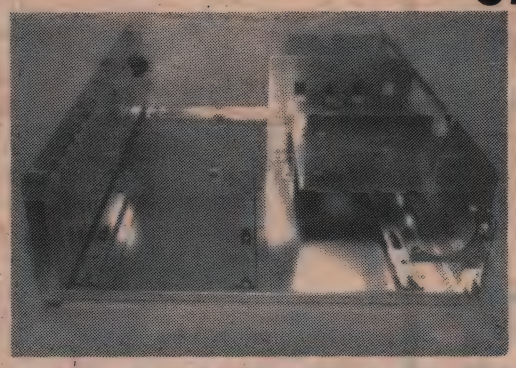

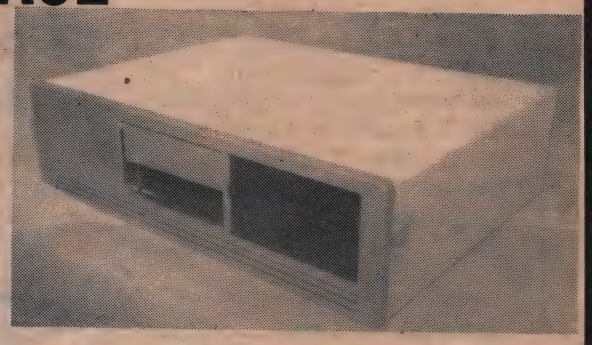

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5230	+5.0V 5% Tol 50mv P-P RV 4.5A to 18.0A	+12.0V 5% Tol 100mv P-P RV 0.1A to 2.5A	-12.0V 5% Tol 150mv P-P RV 0.oA to o.25A	N.A.	$45.00 EA.
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9246	+5.0V 5% Tol 50mv P-P RV 3.0A to 7.0A	+12.0V 5% Tol 100mv P-P RV 0.75A to 3.0A	-5.0V 10% Tol 150mv P-P RV 0.0A to 0.30A	-12.0V 10% Tol 150mv Tol 0.0A to 0.25A	$25.00 EA.

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Assembly Language
Continued from page 142

shorter or longer, or if the origin of assembly changes.

As a final detail, we see three different places where operand arithmetic is used to calculate something. Where does this happen? What is going on?

Once again, the big lumps should be the highest level code you are using, handling the biggest tasks only, and delegating all details to subordinate code that follows.

After the title, you will want to add a few comment lines that explain exactly what the high level code does.

The final field of each big-lump source code should be a comment explaining what is happening. These comments should be as clear and as concise as possible.

In fact. . .

ALWAYS put some comment at the end of just about every op code line in your source code listing.

There is no such thing as overcommenting or overdocumenting a source code listing. Tell us at the end of each line exactly what is happening. Should you need more words than will fit a single comment line, pick up the comment on the next op code and indent an extra space or two so it looks like a continuous message.

To quote Bob Sander-Cedarlof: "The ease of neatness of comments in assembly language nearly always can make a machine language program easier to read and understand than so-called higher level languages."

Little Lumps

The little lumps are intermediate level code. These might be heavy subroutines or supporting modules. If several of these modules are needed, put them in some semblance of order, such as the order they are normally used in the program, or from complex to simple, or whatever seems reasonable at the time.

We'll skip an example of little-lumps code, since it will look just about the same as the big-lumps code. The only difference is where it goes in the source code and how much "importance" you attach to this particular portion of your object code.

Once you get into coding your own programs, you'll find this "three-level" sort of thing becoming more and more natural and ending up as the only way to fly.

As with the big lumps, give us some comment lines at the start that tell us what is happening, and then put a comment on nearly every line of the op code source listings as well.

Crumbs

The crumbs are what is left over after you have handled most of the code. This might be a short stash of file values or a detail subroutine or two.

Crumbs are just as important as the rest of the code. In fact, they most often end up doing practically all of the work, and most code spends most of its time down with the crumbs.

Again, we will forego an example, since a crumb to one source code might be a big lump to another. Just go through the ripoff modules and see how things are arranged.

But remember how despicable an evil structure is. Don't ever bend your program to fit the structure. Always arrange the structure to fit the program. . .

NEVER "bend" the program to fit the structure!

ALWAYS "stretch" the structure to fit the program!

In other words, stay flexible. Adjust the structure to fit the code, and not vice versa. If the structure cracks or breaks when you try this, then flush it and use something else instead. Or use super glue.

Or bailing wire.

Regardless of whether it is a big lump, a little lump, or a crumb, always provide a clear title and some explanation as to what is happening. Then show the actual code, using lots of white space and other pretty printing to make the results as pleasant to view as possible.

As a reminder, the tradition has been to use all uppercase in

Continued on page 145

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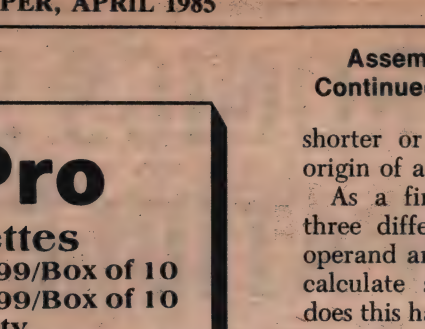

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Assembly Language Continued from page 144

source codes, since some older Apples may not be able to display lowercase. But, if you are writing source code only for yourself, or only for the IIe, you can use mixed cases for your comments if you are using "new" EDASM or a "new way" word processor to enter and edit your source codes. Be sure to retain uppercase for all labels, op codes, and operands if you try this.

You can really get fancy with your borders and artwork if you use all the "new" characters on the IIe.

Working Files

Practically all decent programs will use extensive data files.

A data file might be a map of rooms in an adventure, a list of notes for a song, the text in a word processor, the template for a custom spreadsheet, a table of HIRES colors, or just about anything else you can dream up.

Stashes and working files are different. . .

STASH—

A very short file whose use is not often changed that usually immediately follows its controlling code.

WORKING FILE—

A usually long file that normally goes at the end of a program and whose use may change with program needs.

As specific examples, in an adventure program, the message "IT IS TOO DARK TO SEE" would be a stash that immediately follows the code that checks to see if a lamp or torch is still lit in a dark room.

On the other hand, if you know what you are doing, you can use *one* main program to handle many different adventures, just by changing the working files that get tacked onto the end.

For instance, all of *Scott Adam's Adventures* 1-12 use exactly the same controlling code. Only the data files get changed to alter the situation and the responses. Infocom Inc. uses nearly the same program for *Zork I, Zork II, Zork II, Starcross, Infidel, Planetfall,* and *Deadline.*

Working files should follow the rest of the code for several reasons. They are simplest to change this way. In addition, an assembler's editor may not be the best way to generate long files. Instead, a word processor or a custom code generator might often be better choices. For instance, you might use Applesloth to generate a sine or cosine table for trig uses. With the main files at the end, you can combine assembler source code with word processor files, or use any other combination that works for you.

Here's an example of a *stash.*

```
218 ;                    *** STASH ***
219          SKP3
220 ASAV2    DFB $00     ; ACCUMULATOR SAVE
221 XSAV2    DFB $00     ; X-REGISTER SAVE
222 YSAV2    DFB $00     ; Y-REGISTER SAVE
```

This stash is 3 bytes long, and is used to set aside a "safe" area to save and then restore register values. In this particular case, we only set aside the storage by using the "dummy" $00 values. These will later get replaced with real saves as the program is run. In other stashes, you will carefully and exactly define what goes into a location ahead of time.

In this case, the stash is the only one used, and its use is obvious when it comes up in the assembly listing. Normally, though, you will want to have a few comment lines that explain exactly what the stash is up to.

As usual, tell us what you have, tell us what it does, and then add comments to each and every line.

Yes, stashes are really crumbs, and normally are tacked onto the end of crumb code. But remember that a stash is a file that holds something, rather than working code. You *run* code, but you *use* stashes.

Working files are definitely not stashes. They are blocks of data values you place near the end of your object code. The length and nature of your bulk files change, of course, with your intended program goals.

Relatively short work files can be created with the

Continued on page 146

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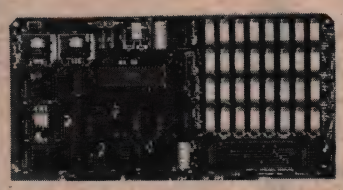

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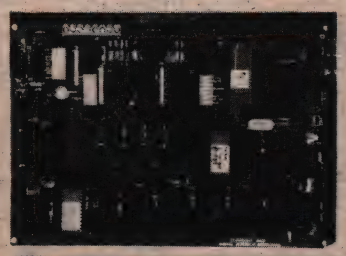

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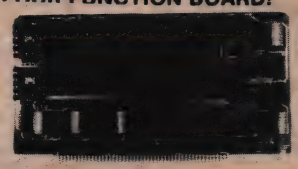

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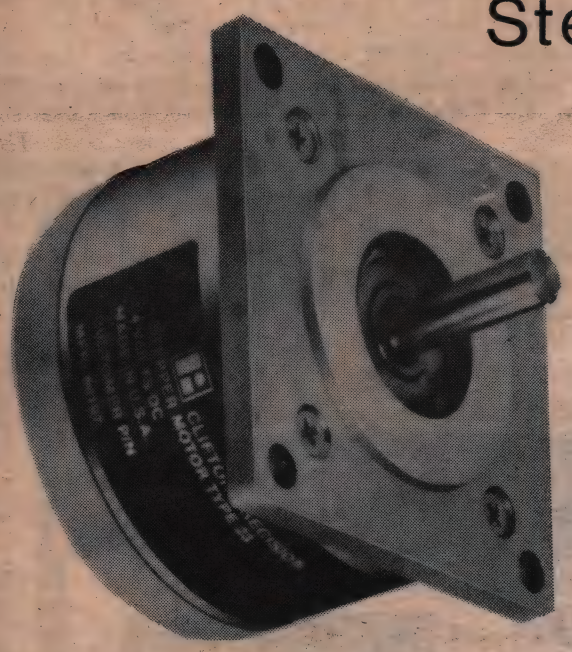

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Assembly Language

Continued from page 145

asembler with the DFB command to define one or a few bytes at a time. For best appearances on the assembler listing, you should define only 8 or fewer bytes per line. You are allowed to "pad" three spaces between your DFB and the data values. This will move all the data values over into the comment field for improved appearance.

As a long file example, here's part of a HIRES pattern file used to get the 191 HIRES fast background colors in *Enhancing Your Apple II* (Sams 21822). . .

```
165 ;                    *** COLOR PATTERN FILE ***
166          SKP2
167          ORG  COLOR+$100
168          SKP2
169 CFILE    DFB       $00,$00,$00,$00,$00,$00,$00,$00
170 PAT1     DFB       $2A,$55,$2A,$55,$2A,$55,$2A,$55
171 PAT2     DFB       $D5,$AA,$D5,$AA,$D5,$AA,$D5,$AA
172 PAT3     DFB       $7F,$7F,$7F,$7F,$7F,$7F,$7F,$7F
173 PAT4     DFB       $80,$80,$80,$80,$80,$80,$80,$80
```

In this case, 8 bytes are used at once to set the background color of the HIRES display cell that is 4 bytes wide and two scan lines high. The file continues for a total of 256 bytes. The file holds a total of 32 of the possible 191 solid HIRES colors or your choice of any of a mindboggling 18,446,744,073,709,551,616 HIRES patterns.

Files can be any length you need, but their access gets trickier if you go beyond 256 bytes. Files of a page or less can be reached with indexed addressing, while you have to go to indirect indexed addressing for longer entries.

If your file meaning and intended use is not totally obvious, be sure to add a few comment lines at the beginning to explain what is happening. Do this the same way did the documentation on the big lumps, little lumps, and crumbs.

You don't have to use DFBs to create your file if you don't want to. Sometimes, you can use DWs to define 16-bit addresses in a file, or DDBs to define other 16-bit values that are appear in "frontward" order. But, note that you only are allowed one DW or DDB per source code line. We've seen how you can have up to eight DFBs per line instead.

And, once again, there may be better ways to build long working files, such as using a word processor, a custom program, a graphics tablet, input from a scanning plotter, digitized video, or whatever.

You can also use the ASC command to generate ASCII message files. . .

In this case, we have used the ASC pseudo-op to generate our text, and the DFB pseudo-op to handle a carriage return and a "double zero" end-of-message marker. This happens only because the source code previously EQU'd the label C to $8D and an X to $00. You'll find several examples of this in the ripoff modules.

Remember that the ASC command always starts with a delimiter. This can usually be a quote symbol. If you actually want a quote symobl to appear on the screen, you should use some other symbol instead.

Like so. . .

```
ASC  "ITS TOO DARK TO SEE"
ASC  /PRESS "RETURN" TO CONTINUE/
```

Again as a reminder, the first delimiter is essential, but the end one can be left off if there are no comments added to this line. But this gets dangerous if there are trailing spaces. What you see might not be what you get.

Summing up. . .

Limit each individual ASC command pseudo-op to 40 or fewer characters.

Put three spaces between ASC and the first delimiter of your ASCII message.

Do control commands with separate DFBs using simplified labels.

These hints will give you a very clean printout on your assembler listing, and make for easy insertion of control codes.

"New" EDASM also has a STR command that precedes your text string with a character count byte.

Creative use of labels can let your assembler do most of the dogwork of converting from "people" to "machine" values. Note how much easier it is to enter a DFB C than it is to look up the ASCII carriage return value and then do a DFB $8D. It gets even better when several different control commands are handled by one DFB.

The "old" EDASM editor does not directly support lower case ASCII messages, but "new" EDASM and both its assemblers do. If you are editing with a "new way" word processor, it is a trivial matter to enter lower case ASCII into files. Just be sure you use the CAPS LOCK on all your labels, op codes, and for

Continued on page 148

```
115          ASC       "WITH THIS METHOD, EACH MESSAGE STRING"
116          ASC       "FOLLOWS ITS OWN JSR CALL, IMBEDDED IN"
117          ASC       "ITS OWN SOURCE CODE."
118          DFB       .C,X
```

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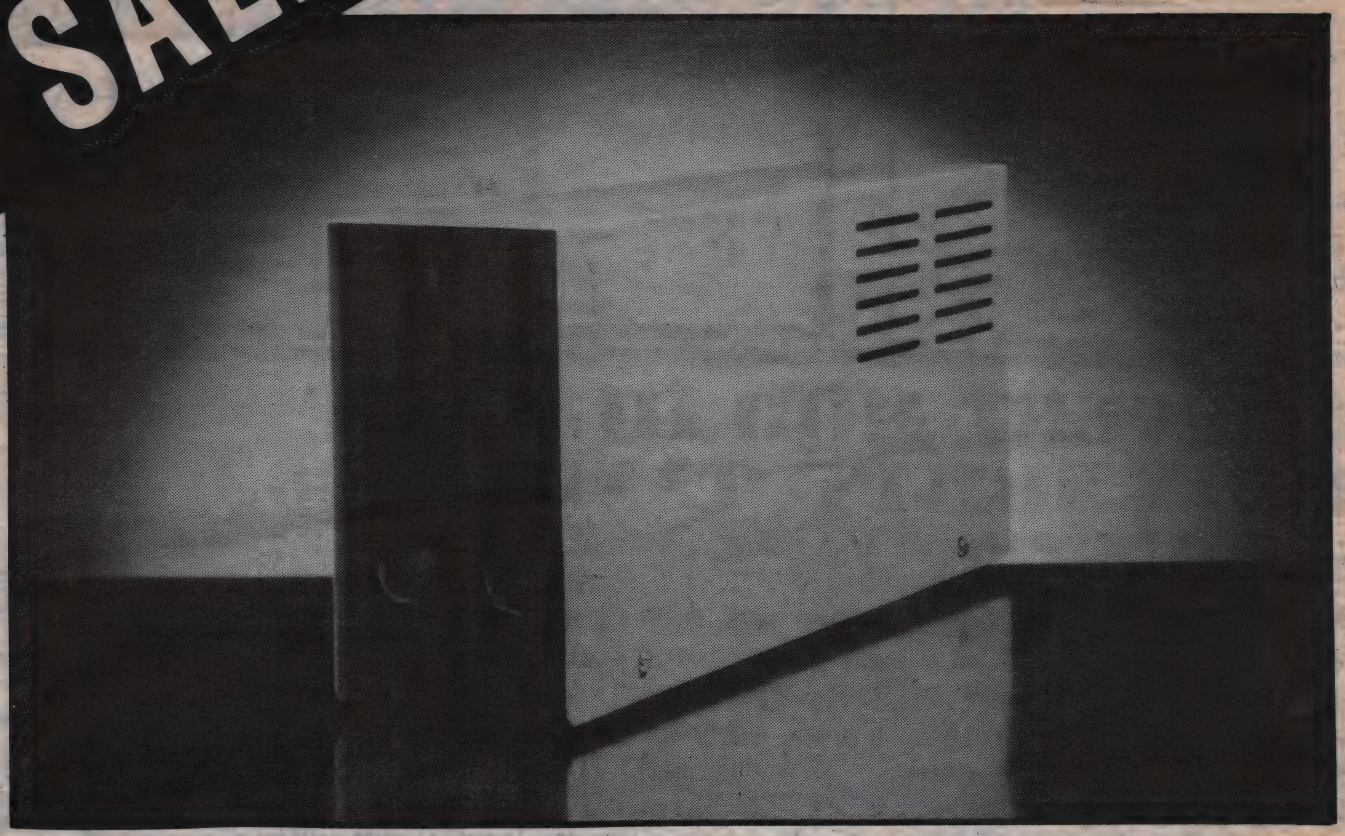

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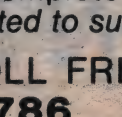

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Assembly Language
Continued from page 146

all operands other than ASC or STR.

Remember that lower case characters will show up as gibberish on an unmodified Apple II or II+ screen, unless you convert them back to upper case before displaying them. To be compatible both ways, you insert a "DO YOU HAVE LOWERCASE?" prompt inside your program, and then make some corrections if lower case is not available. "New" EDASM gives you several ways to handle this.

Most newer assemblers can directly generate lower case text. If yours cannot, just use a word processor for the editor, or else take the final object code and "force feed" case changes where you want them.

A word processor is usually the best way to generate text messages, particularly if they are very long or involve lower case. Instead of using ASC pseudo-ops, you build an entire message file with your word processor, binary save it to disk, and then link that message file directly with your object code. This method entirely bypasses all assembly hassles, although a text file to binary file conversion routine might be needed.

Bottom Line Comments

At this point, your source code should already have all the information the assembler needs to put together object code. If anything seems to be missing, go back and stuff it into its proper big lumps, little lumps, crumbs, or working file slot.

The bottom line is a good place to put credits and any other notes or comments you feel you really should mention.

Here are some typical bottom line entries. . .

Continued on page 150

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Assembly Language
Continued from page 148

```
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655 ;     ENHANCING YOUR APPLE II (SAMS 28424).
656 ;
657 ;     MOOSE CHOREOGRAPHY BY ELAINOR FAIRLEY.
658 ;
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662 ;
```

The bottom line is where you give credit for what was done and a sales pitch for anything newer or better that you may offer. Put anything you want to here. Just don't preach to the choir.

Label References

Strictly speaking, our final two parts to our structure aren't really part of the source code. Instead, they are things that get tacked onto the end of the assembly listing during the assembly process.

Anyway. . .

One very handy thing to have when you are analyzing any machine langauge program is a list of who does what to whom. Most assemblers will provide some sort of a reference list at the end of their listing if you ask them to.

EDASM provides a simple version called a symbol list or a *label list*. Other assemblers or disassemblers may provide a more complex listing called a *cross reference*. . .

LABEL LIST—

A listing of each and every label used in a source code, along with the label address or label value.

CROSS REFERENCE—

A listing of each accessed memory address, along with the addresses of who called it for a load, jump, store, branch, subroutine call, or whatever.

Continued on page 151

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Assembly Language

Continued from page 150

The label listing shows you which labels get used. They also point out glaring errors, such as reusing the same label, or getting an op code such as CLC, over in the label column by mistake. Improperly spelled labels or labels "alike but different somehow" become obvious. Really strange labels that result from typing errors also will leap out at you from the label list.

EDASM flags any unused labels with question marks. This brings these to your attention just in case the label really is a mistake, rather than something that you put in as a memory jogger or for outside access.

The EDASM label listing is normally provided in alphabetical order by label spelling, and then in numeric order by label value. These listings are extremely handy when you need them, but otherwise are a painful waste of printer time and paper. You can turn the EDASM label listing on or off by a LST OFF or LST ON command as the *last* line in your source code.

"New" EDASM gives you all sorts of "mix and match" listing options, including execution time display and several formatting options.

A full cross reference is much more powerful than a simple label listing, since these show you every use of every address used or referred to anywhere in the program. This is most useful for tearing into other people's programs, and for answering, "Now why on earth did I do that?" on your own source codes. Full cross references are often broken down into separate internal, external, and page zero listings.

Some other assemblers will provide a full cross reference on command. The simplest way to get a complete cross reference out of EDASM is to assemble your object code and then disassemble it with *RAK-Ware's* DISASM or something similar.

Error Messages

One of the first joys you will undoubtedly encounter on an early assembly attempt, is that you will write a ten line program and get 34 error messages as a result.

You get error messages when you tell the assembler to do something so stupid that it simply doesn't understand you.

ERROR MESSAGE—
A listing of a problem you created by telling the assembler to do something illegal or something it just plain did not understand.

EDASM generates two different kinds of error messages, those that apply to the assembly process, and those

Continued on page 152

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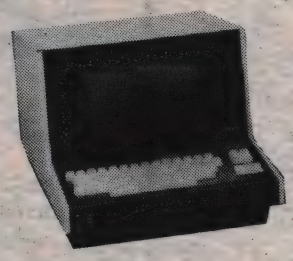

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Assembly Language
Continued from page 151

that involve disk access.

We'll look at specific error messages later. Our goal here is to recognize that you'll most likely get bunches of error messages tacked onto the end of your assembler listing.

Some errors are very subtle. Mixing up "eyes," "els," and "ones" or "ohs" and "zeros" are good ways to confuse EDASM. Having too many or too few tabs or tabbing spaces so you get in the wrong field is another. This one gives you a label called LDA or an op code named RESTART.

Of course, leaving that at "$" sign off an operand will automatically mix up decimal

Continued on page 154

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Assembly Language
Continued from page 152

and hex values. An entry of LDA #60 will put a value of #3C in the accumulator. And, of course, an entry of LDA 60 can put darn near anything in the accumulator. Why?

An extra comma at the end of a string of DFBs does all sorts of nasty things, as does forgetting or imbedding the delimiter in an ASCII string.

Blank lines in EDASM are a no-no. Yet, they are *absolutely essential* for a decent and readable assembly listing. Use the SKP pseudo-op instead, or else a comment line that starts with ";" or "*." It is very easy to get fumble fingered or hit the wrong keys to exit an "old way" editing or entry mode. This puts strange values onto strange program lines for you. It is also easy to accidentally imbed control characters inside your program lines during "old way" editing.

Labels and other values default to zero if not defined. Which creates bunches of new problems all by itself. But, you'll find out all of this soon enough on your own.

Will you ever.

There is one totally meaningless error message that EDASM may give you some time. This message is "***SUCCESSFUL ASSEMBLY: NO ERRORS."

All this message tells you is that. . .

A hard-copy printout that says SUCCESSFUL ASSEMBLY: NO ERRORS tells you that:

1. **The printer was turned on,**
2. **There was enough paper,**
3. **The ribbon is not illegible.**

You see, it is perfectly possible to enter totally legal commands in totally legal sequences to EDASM, and still end up with object code that simply won't work. All the success message tells you is that you haven't done something so blatantly stupid that EDASM couldn't take a stab at guessing

Continued on page 158

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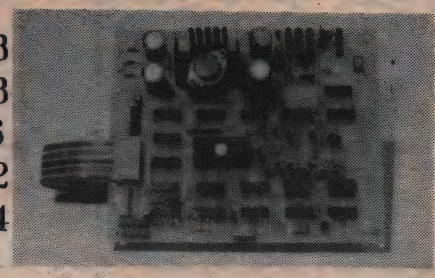

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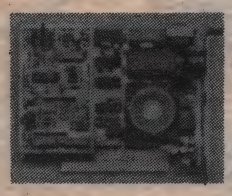

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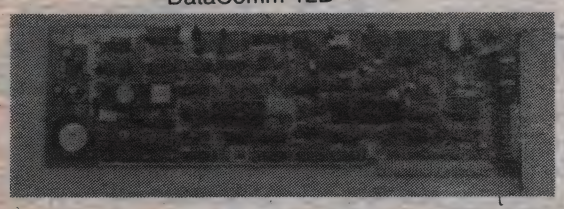

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Cooling Fan with Two Outlets & Surge Protection	69	**35**
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Replacement Keyboard	159	**69**
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Power Strip with Surge Protection & 6 Outlets	59	**20**
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Smarterm II (80 Col. Card for II+)	179	**149**
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Mach III with Fire Button for II+	49	**42**
Paddlestick for II+	49	**35**
Mach II Joystick for //e	44	**38**
Mach III with Fire Button for //e	54	**45**
Paddlestick for //e	44	**35**
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Starter Kit	49	**39**
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Gold Card CP/M 192K	775	**469**
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Shuffle Buffer Par/Par (128K)	499	**399**
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RamCard	99	**79**
SoftCard	425	**309**
SoftCard Premium System for II+	695	**529**
Premium SoftCard //e	395	**289**
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Dumpling-GX	89.95	**79**
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64K Ram Card	199	**159**
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Magnum-80 80 Col. Card for II+	199	**159**
Magnum 80me (80 Col. with 64K) for //e	139	**119**
Dumpling Interface w/16K Buffer	215	**169**
Q Disk RAM Card	399	**309**
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Music System w/Software	395	**309**
The Clock	280	**219**
MPC PERIPHERALS		
64K Ram Card +80 Cols for //e	289	**149**
ORANGE MICRO		
Grappler +	175	**119**
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Appli-Card 6MHz/64K RAM Extender II, //e)	495	**339**
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32K Microbuffer II (specify printer)	219	**169**
GraphiCard (with 6' parallel cable)	99	**79**
16K Microbuffer II+ Parallel	259	**199**
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Snapshot	119	**95**
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eRam 80 - 80-Col., 64K for //e	135	**115**
SWEET MICRO SYSTEMS		
Mockingboard A (Stereo Music)	124	**92**
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Mockingboard C (A + B)	219	**155**
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AGE-200 Game Paddles for //e	39	**32**
Select-a-Port for II, //e	49	**39**
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64K Ram Card for II+, //e	349	**169**
128K Ram Card for II+, //e	499	**229**
64K Ram + 80 Col. for //e	249	**199**
128K + 80 Col. for //e	399	**299**
192K + 80 Col. for //e	499	**379**
Accelerator //e (II+, //e)	599	**259**
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FOR APPLE //c & MACINTOSH

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Super 5 Direct Slim Drive for //c	369	**195**
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Color Graphic Board	239	155
Monochrome/Graphic/ Printer Board	329	**189**
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64K Ram Card	295	**239**
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NEC		
JB 1201MA 12" Hi/Res Green	179	**149**
JB 1205 12" Hi/Res Amber	210	**159**
JC 1215MA 12" Lo/Res Color	399	**299**
JC 1203DH Hi/Res RGB Color for IBM	699	**589**
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Digital Research's GEM Operating Environment Debuts On Atari

Digital Research Inc. announced at the Consumer Electronics Show (CES) here recently that it has signed the first in a series of agreements with microcomputer manufacturers licensing its GEM (graphics environment manager) operating system extension and GEM desktop application.

Atari Corp., is the first original equipment manufacturer (OEM) whose personal computers will take advantage of GEM software's capabilities to provide a user interface like that of the popular Macintosh computer. Beginning in the first quarter of 1985, GEM software will be available on the ST line of Atari personal computers product line of business personal computers.

GEM software eliminates cryptic operating system commands by presenting the user with a pictorial representation of a desk's surface. Familiar icons of disks and a wastebasket appear on the desktop, while folders and documents appear in user-controlled windows. Simply by moving the mouse and clicking its button, the user can open a file, run a software program, delete a file, or do anything else allowed by the operating system.

"Because the GEM graphics-oriented user interface is easy to learn and use, these OEM agreements will make powerful personal computers accessible to a large number of consumer and business users," said John Rowley, president of Digital Research. "By 1986, we expect that GEM will be in use on more than a million machines."

GEM Interface On New Atari Line

The entire family of Atari ST personal computers, based on the Motorola 68000 microprocessor, will employ GEM software. The first members, announced here, are the Atari 130 ST and 520 ST. They use a proprietary operating system developed jointly by Atari and Digital Research.

Said Sam Tramiel, president of Atari, "We chose the GEM interface because it represents the most advanced microcomputer technology for consumers to learn and use personal computers. It will help place Atari in a position to offer a powerful, easy-to-use personal computer at a low cost."

Apricot Computers To Incorporate GEM

Britain's ACT and its U.S. marketing and distribution affiliate, Apricot Inc., will use GEM software worldwide on MS DOS-based business microcomputers to give them "cut-and-paste" facilities, complete graphics device and mouse support, windowing capabilities, icons and pull-down menus.

Existing MS DOS application programs not adapted to take advantage of the GEM software interface capabilities can still run unmodified on Apricot machine.

The entire Apricot product line will use GEM software, including the 512K Apricot F1s, the Apricot PC floppy disk, Apricot XI, the Apricot Por-

Continued on page 158

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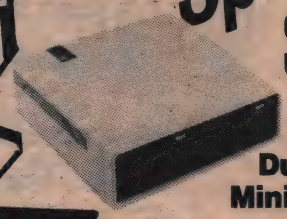

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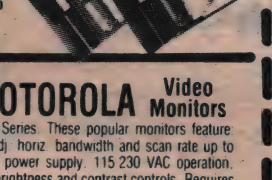

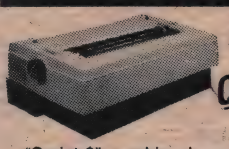

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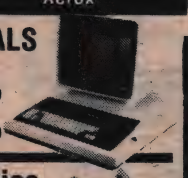

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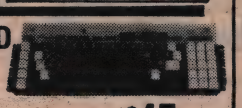

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With schematics
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Assembly Language
Continued from page 154

what it was you were trying to tell it to do.

Naturally, if you have error messages, the program is *guaranteed* not to run. If you have a success message, the program probably will *still* not run, or at least not on your first dozen tries.

For a successful program, you must first enter and use legal commands in a legal way in EDASM. After that, the object code that EDASM generates also must do legal things in an expected way for your program to work.

That just about completes our sixteen steps of a structured assembly language listing. The first of the ripoff modules is called EMPTY SHELL.-SOURCE, and appears later. This one is sort of like a Christmas tree you can hang all your ornaments on, and greatly simplifies organizing an structuring your source code. Since it is usually easier to edit a source code than create one, you might like to start with the empty shell and adapt it to your particular needs. Much more on this later.

For now, though, it looks like we are almost ready to actually enter and edit some source code. ●

Digital Research
Continued from page 156

table and the Apricot F1 and F1s microcomputers.

Agreements With Independent Software Vendors

In order to ensure the success of GEM software, Digital Research has entered into agreements with a number of independent software vendors to provide GEM application software that will run on any MS DOS machine. In addition, software written to the operating system extension can be easily recompiled for the Atari ST personal computers. Thorn EMI/Perfect Software, Chang Labs, Lifetree Software and Matrix have all agreed to write GEM software that takes advantage of the graphic interface.

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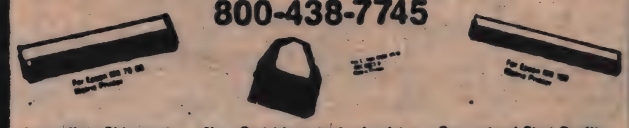

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Epson MX 70/80, Apple Microcomputer*	18.65	34.35	62.75
Epson MX 100 Zip Pack, Black Only	20.35	37.70	69.45
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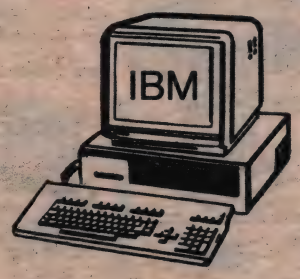

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Portable Computers:

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"We've seen a revolution in computers undreamed of by science-fiction writers," says Clarke, author of "2001: A Space Odyssey" and its sequel, "2010: Odyssey Two," currently a popular film. "People never conceived the extent of the micro-electronics revolution in the area of computers. Twenty or thirty years ago, nobody thought of portable computers."

Today, because of portable computers, writers like Clarke have the freedom to write anywhere, anytime, at home or while globe-trotting. He says, "The Portable liberates me from the office. I can write notes and drafts wherever I go, using the built-in word processing software."

A resident of Sri Lanka, an island off the coast of India, Clarke has an outdoor "office" at his favorite beach. Because The Portable is battery-powered, Clarke can take it with him and enjoy the sunshine while working. "I do some skin diving and then sit under palm trees and write with my Portable -- working on notes and chapters of another book. Later, I can feed everything into my Archives III word processor for final formatting. That device and The Portable are complementary."

The Portable comes with built-in software that allows users to share data with other computers. It also hooks up to HP's ThinkJet printer, a lightweight, battery-powered printer that fits into a briefcase.

In addition to its ease of use, Clarke admires the look of his Portable. "Styling isn't everything, but it is important. The Portable is a beautiful machine. I like its size and portability."

Although Clarke is best known for his science fiction, he is also a renowned scientist concerned with expanding the frontiers of space. "The first week I had the machine, I used it for a very important purpose -- drafting a letter to the New York Times in favor of continued space exploration." His spirit of adventure is mirrored in a statement written almost 20 years ago: "I intend to go to the moon when tourist service starts." Now that The Portable has been developed, chances are that he'll tote it along.

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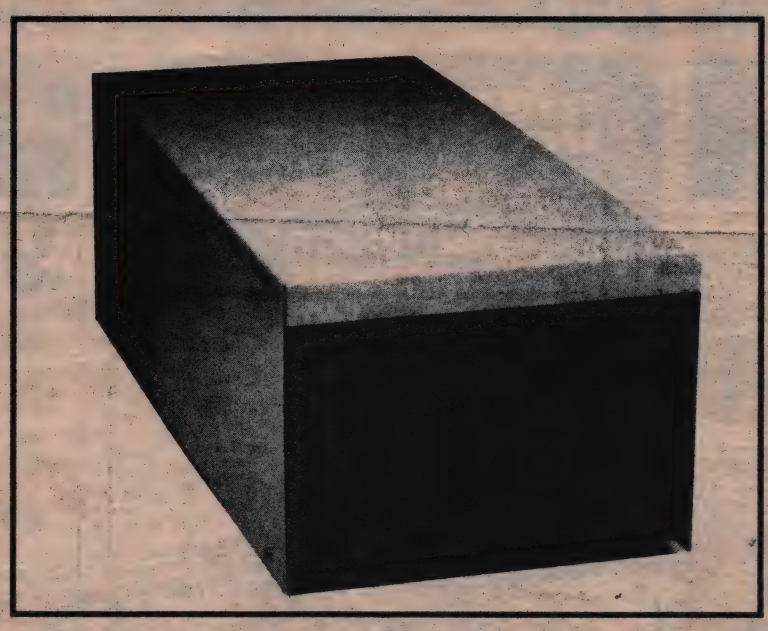

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Bush Introduces One-Piece Computer Desk With Vertical Storage

The latest addition to Bush Industries' growing selection of computer furniture is a compact, one-piece desk with vertical storage.

Its arborwood vinyl finish gives Model CT137 a rich, handsome look that's well suited to either home or office decors. Dark brown shelves add a touch of contrast to this highly-functional desk.

"This is Bush Industries' first computer furniture piece made of arborwood as well as our first one-piece computer desk with vertical storage," noted Bill Schaeffer, Executive Vice President of Sales & Marketing. "At a suggested retail price of $219.95, this is an exceptionally attractive and useful unit."

Model CT137 was designed

Continued on page 161

Bar Code Reader For IBM PC/XT

PERCON has introduced the E-Z-READER with an interface specifically designed for use with IBM PC compatible keyboards. "This is the first bar code reader introduced for the IBM PC/XT that is designed to read dot-matrix as well as conventionally printed bar codes, connect to the system without taking a slot, and be completely compatible with existing software which uses keyboard data entry" says David Whitehill, President of **PERCON.**

"We felt many of our customers would want to produce their own labels," explains Whitehill. "We first analyzed how dot-matrix printers would print bar codes. Then we specifically designed the E-Z-READER to compensate for dot-matrix characteristics and also to be able to read commercially printed high-density code."

"Connecting the E-Z-READER couldn't be simpler," reports Pete Harnack, **PERCON** Director of Marketing. "You unplug the keyboard and plug its cable to the E-Z-READER. Then attach the E-Z-READER cable to the computer. Electric power is supplied by the keyboard cable. The keyboard can still be used as usual."

"Adapting existing software for use with new hardware is a concern of both end-users and value added resellers," explains Harnack. "The E-Z-READER eliminates that concern because the E-Z-READER functions like a keyboard and in some cases, may replace the keyboard."

The E-Z-READER is supplied with a number of built-in user selected options. Designated 330A, the E-Z-READER lists for $595 which includes the wand and is available for immediate delivery. Bar code printing software is also available.

For further information contact **PERCON**, 2190 West 11th Street, Eugene, Oregon 97402.

Mention that you read about it in Computer Shopper. ●

Bush Introduces
Continued from page 160

for the personal computer user with limited space. Although it measures only 52 inches high by 49 inches wide by 24 inches deep, this unit can accommodate a surprising amount of hardware, software, peripherals and accessories.

Among the unit's most convenient features are a large, usable desk surface and a tapered front edge for user comfort. A conveniently-placed drawer is large enough to hold papers and supplies.

A full-length book shelf with retainer rail provides storage space at the top of the unit. A smaller storage shelf and the monitor shelf are both adjustable to suit the computer owner's needs. Floor levelers, which keep the unit on an even footing and eliminate vibrations, round out the desk's list of features.

Model CT137 is available for immediate delivery. Bush Industries is currently the second largest manufacturer of electronic furniture in the country. In addition to computer furniture, the firm produces a complete line of vinyl veneer and solid wood furniture for home and office use, including units for audio/video equipment and microwave ovens.

Space Odyssey author Arthur C. Clarke uses his HP Portable at Griffith Observatory.

For further information contact Bush Industries, Inc., 312 Fair Oak Street, Little Valley, NY 14755. 1-800-228-BUSH. In New York, 1-800-248-BUSH.

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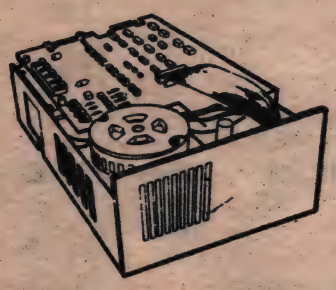

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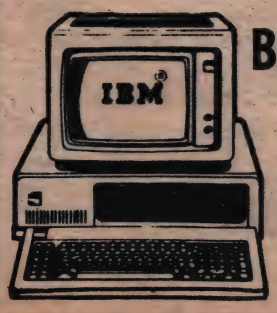

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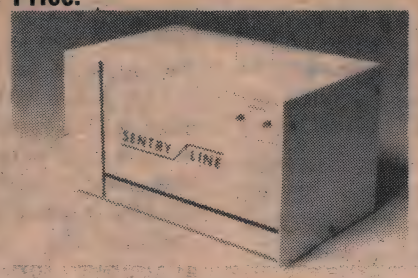

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Freeware: Unique Concept For High Quality PC Software

by H.L. Nieburg

Some of the best software available for PC-type computers is available free-of-charge, can be copied and given away to anyone at will, and often is available for down-loading on user group bulletin boards. Yet it is not public domain software. The stuff is copywrited and highly professional, offered to the public under the concept of "freeware," or "shareware."

Quite a catalog has grown up under the freeware concept, of which the best known are probably PC-Write, PC-File, and PC-Talk. There are plenty of other programs kicking around, some of them very good, such as Prokey, Newkey, Clock, PRT, Ladybird Graphics, Epistat, and on and on. They are available for the taking and sharing. No guilty consciences, no "limited use demo only versions," no "if you open this package you have accepted a license agreement," no "once you have made a purchase, you are stuck!"

Freeware is not really free. Rather it is distributed on an honor system. If you find yourself using a package and liking it, send a nominal amount to the programmer. No one can force you to do it; but if you register as a user, you will receive current updates, and technical support. In some cases, you might even get back a portion of future fees, in the event that people who secured their copies from you register as users.!

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Continued On Page 164

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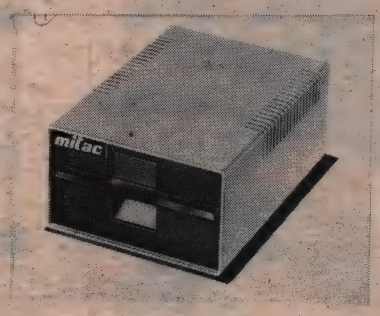

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Freeware
Continued From Page 162

the Hippie free stores, bread cast upon the waters... But it is also a hard-headed solution to some of the problems of marketing original software. There are many creative programmers out there who do not wish to become part of a megalithic business enterprise. They do not have the resources for large scale distribution and do not want to devote most of their time to this end of the business.

Does it work? I asked Bob Wallace, the author of PC-Write, and he said, "We do very nicely!" His company just expanded to four people. It seems that the act of mutual respect and trust inspires reciprocation. The author implies, "I'll let my work speak for itself. If it serves anyone, I am pleased. If now and then someone feels moved to send me $35, I am not only pleased, but more important, that is enough to make the whole system viable."

The concept is based upon simple principles: People need to try programs to see if they are useful. Software authors can be supported directly by users. Copying and networking of programs can be encouraged.

There are programmers who love to program and offer truly excellent products, such as the 3-way package of PC-Write, File, and Talk. Each of these has a different originator, yet they complement each other beautifully. PC-Write's Bob Wallace lives in Seattle, Washington; PC-File was done by Jim Button of Bellevue, Washington; and PC-Talk by Andrew Fluegelman of Tiburon, California.

I only began to take freeware seriously because it solved a specific dilemma. As a college teacher, I was anxious that students take advantage of the roomfuls of newly-acquired IBM-PCs at my institution. I looked into multiple user licensing of some software I had been using for myself. It was technically unlawful for me to lend my software for class use. I found prevailing practices absurd and self-defeating. Since I wanted open-ended licences for dozens of students, the costs and rigidities were ridiculous and unrealistic. So I began to look

Continued On Page 165

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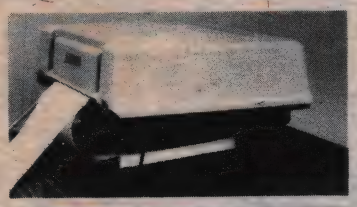

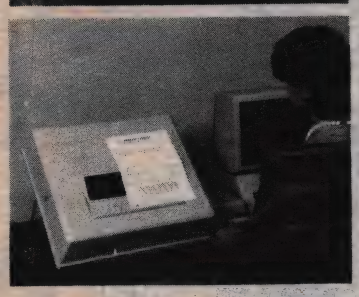

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Freeware
Continued From Page 164

at freeware. Great was my surprise and delight to discover that all three of these programs are clearly equal or superior to many varieties of the high-priced spread.

I could freely give copies to all students. Whether they found any of it useful enough to send in a fee, that was strictly between them and the authors of the software. In fact, I have heard of several students actually registering as users. In fact, it still amazes me that the cynical student population of today does in fact respond to an act of good faith now and then.

Had it not been for this problem, I probably would have continued to take freeware lightly. In this and future articles, I will offer brief tutorials of these three programs. These are intended not only to provide access to new users, but also to demonstrate the sophistication and power offered by some of the most advanced software around. And it's free, unless you choose to pay something for it -- and only after it has proven its usefulness to you.

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Continued On Page 166

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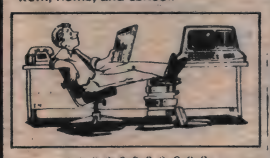

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Freeware

Continued From Page 165

mutiple buffers in RAM, and, would you believe, Windows? Yes, excellent windows for editing two files simultaneously, and eight pages of help files immediately accessible with function keys!

I have tried about 30 word processing programs, including all of the best sellers, but keep coming back to PC-Write. In addition to on-screen formatting, there are, in the current version imbedded commands to use every variety of fonts available for the best dot matrix printers. True super and sub-scripts, italics, single and double underlining, cross-out text, delete, compressed, expanded, everything can be implemented in the same file, on the same page! Even changes in spacing between the lines.

Let me just touch on a few of key routines for editing text.

!!Welcome To PC-Write!!

- A Short Tutorial -

At any time while working on a text, you can obtain help by hitting F1. Then by hitting the right and left arrow keys on the right of the keyboard, you can scan through eight pages of the help file, one at a time.

Hit F1, then hit the right arrow key. See what happens on the screen. Then return here by hitting F1 a second time. This will display all the commands and their uses. You can return to your work by hitting F1 again.

To begin writing or editing in an existing file, hit Escape. To open a new file, hit F1. Follow the instructions ON THE TOP of each screen. While editing you may strike a wrong command. If that happens and you cannot see any obvious way to repair the damage, then try cancelling the command by hitting F1 twice.

Moving Around The Text On The Screen:

You can examine a document or move it around in several different ways:

(1) Hitting either the PgDn and PgUp keys will move the screen one line at a time, leaving the cursor wherever it was.

(2) Hitting either the arrow up or down will move the cursor accordingly. When the cursor is at the top or bottom line on the screen, then the screen will begin to scroll one line at a time each time arrow up or down is hit.

(3) Hitting the shift key and one of the PgDn/PgUp will scroll through the text one page at a time.

(4) Hitting the control key and one of the PgDn/PgUp keys will scroll the text one paragraph at a time up or down. NOTE: This is also the method used to move the cursor to the beginning of any paragraph.

(5) To move the cursor one sentence at a time: Each time you hit the + or - keys on the extreme right of the keyboard, the cursor will move forwards or backwards one sentence at a time. This capability will remain in the program unless you hit F9 and change the find command (don't worry about it now).

Try examining the document by each of these five methods. You may also move to the top or bottom of any document by hitting the shift key in combination with either the + or the - keys on the extreme right of the keyboard. Try going from the top to the bottom of this text a time or two.

Moving The Cursor Around The Text:

Practice moving the cursor around the text with the four arrow keys. Now try moving the cursor from the right to the left of the screen. This is done by hitting the Home and End keys.

Now try moving the cursor from word to word. This is done by holding down the control key while hitting the arrows pointing left or right.

Finally, the cursor can be moved to the top or bottom of the screen by hitting the shift key together with the up or down arrows.

Deleting Text On The Screen:

time: BkSp (deletes to left) Del (deletes to right).

Delete from cursor to end of line: control key and carriage return.

Delete a word to the left of the cursor: control and backspace.

Delete a word to the right of the cursor: control and escape.

Delete a large block of text: set cursor at first character of

Continued On Page 167

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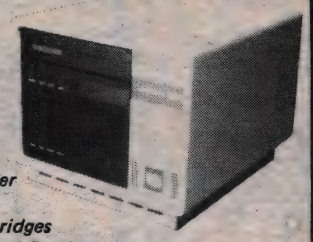

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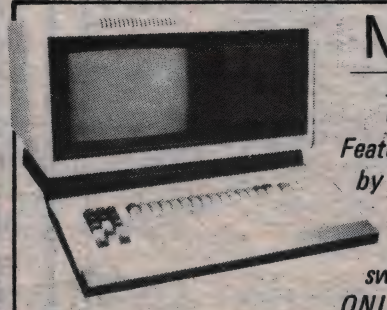

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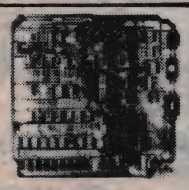

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Freeware

Continued From Page 166

block and mark with Control-F6 (for lines) or just F6 (for words). If you use the former, move cursor to end of block and it will mark automatically. Note that excerpt is marked with color background or reverse video. If you use word marking (F6), use the right of left arrow key to continue marking one word at a time, or use the up and down arrow keys to mark subsequent lines. Now hit F4, and excerpt will disappear. Hit F5 to eliminate marking.

If you make a mistake and wish to bring back deleted material, you may do so by hitting Control-F4. Block of text from last delete will still be available for retrieval at any time, until you delete or move another block.

To delete a sentence at a time: you can move the cursor one sentence at a time by hitting the + or - keys on the extreme right of the keyboard. The + will go forward to the end of a sentence. The - will go backward to the beginning of a sentence. If you hit F6 first, then each time you hit the + or - keys you will mark one sentence. Now hit F4 to delete those sentences which have been marked. Then hit F5 to remove any unseen markings.

To delete one paragraph at a time: place cursor at first character of a paragraph. Hit F6. Now each time you hit Control-PgDn, you will mark one paragraph. When marked, they may be eliminated by hitting F4. Hit F5 afterwards to remove markings.

To remind you again, it is possible to unerase, that is, bring back a block, if one has made a mistake, by hitting Control-F4 at any time before marking another passage.

To Enter New Text:

Place the cursor in correct position, and type as you would on an old-fashioned typewriter. Do it now. Text can be entered in two different modes. The push mode is normal and inserts the new material where the cursor is, pushing existing text to the right. There is also an overwrite mode, achieved by hitting the Scroll Lock key. Now any new typing will overwrite any text at the cursor. Return to the insert mode by hitting Scroll Lock again. Try this a few times.

To Find A Place In Text:

It is useful to be able to go directly to a selected place in a text. This is done by hitting F9. Note that the cursor is blinking on the period between the quotes. Delete the period (use delete key), and type in the string (characters) that you wish to go to. Now hit the + key on the right end of keyboard. This will take you to the first occurrence of the string. Each time you hit the + key, the text will display the cursor at the next occurrence. To go backwards in the same manner, hit the - key on the right end of the keyboard.

To Find And Replace In Text:

It is easy to find and change some word in text, some or all of its occurrences. Hit F9 and note the cursor blinking in the top line on screen. First, delete the period between the quotes, and type in the string of characters which you wish to change. Now, hit F10. Note that cursor is now in the second set of quotation marks. Type in the characters you want to substitute. Now you can hit the + (go forwards) or - (go backwards) keys on the extreme right of the keyboard.

Each time you hit the + or - keys, the cursor will move to the next occurrence of the string. On each stop, hitting F10 again will delete the old string and replace it with the new one.

You can do a global replace (that is, replace the string throughout the text) by placing the cursor at the top of the file and typing Alt-F10.

To Hold Your Place In Text And Return To It:

Mark your place in the text by hitting Control-Home. Now you can move anywhere else in text, returning to your place at will by hitting Control-End.

Transposing Letters:

Put cursor on second letter to be transposed. Now hit Shift-Backspace.

Continued On Page 168

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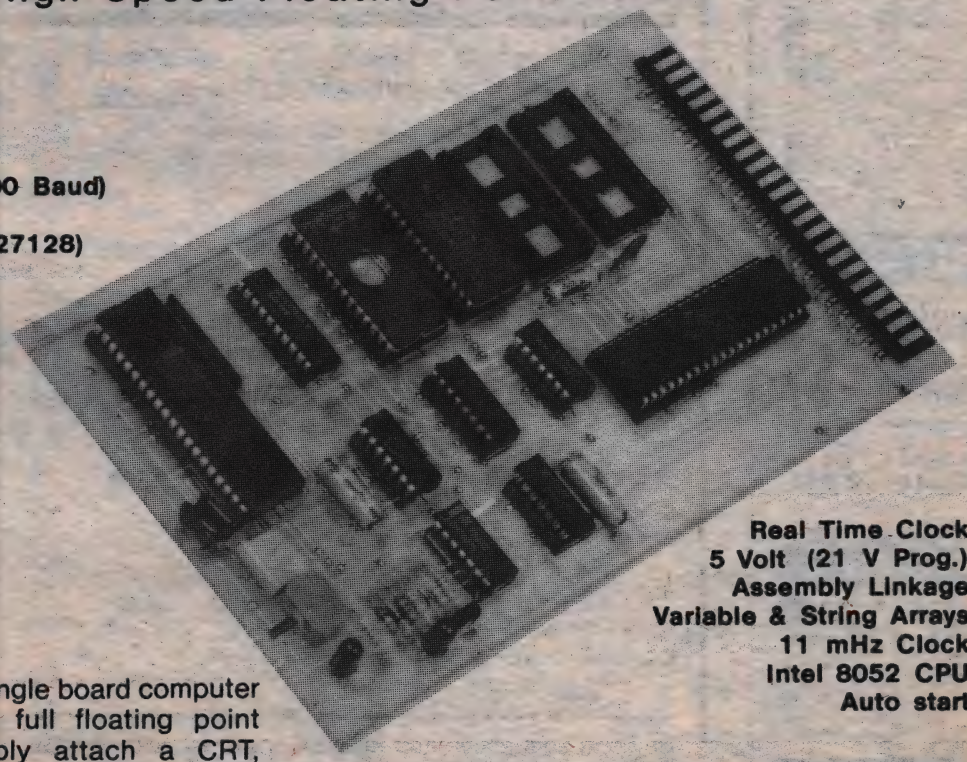

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Freeware
Continued From Page 167

Changing Margins:

Hit F2 to show ruler. Reset the R on the right to correct position. Hit F2 again to set and remove ruler. Try this on this file by changing ruler and then reforming a few paragraphs as follows:

Set the cursor at the beginning of a paragraph and hit F7. If you wish to make the change permanent (but don't do it with this text, please), then save the reformed document by hitting F1, and then F3. Screen will automatically return to text after saving it to disk. To exit without saving (don't do it yet) press F1, Escape, and then F2.

If you want your text to have justified margins on the right, that is all the lines of the same length (as this text is), hit Control-F7. This will turn on the "Justify" mode; note top line which can be switched by this method from "Just OFF" to "Justify". In either mode, a paragraph can be reformed by setting cursor at beginning and hitting F7.

To Move Text Around:

Now let us try moving a block of text to a new position. First, set the cursor at the beginning of the block. Hit F6. Now move the cursor to the last line of the block. Note backshading. Hit F4 to delete.

Now move cursor to position where you wish text to be moved. Hold Control and hit F4. Now remove marking by hitting F5.

Try this a few times by moving things around at will. You will not change the document unless you cop it to disk. The text which you see on the screen is in the memory of the computer. Until it is written to the disk, it does not affect the permanent copy. You can make this modified text the permanent copy by hitting F1, followed by F3. We can exit from this text by hitting F1, followed by Escape and F2, which will return you to a DOS prompt.

Now To Do Windows!

Position the cursor on the middle line of text, about 12 lines from the top. Now hit F21 to insert the ruler. To bring two files to the screen at once, move the cursor into the bottom half of the screen and hit F1. Read top line. Note F6: switch files. Hit F6. Cursor is blinking in the top line on the first character of the file name. Write in the drive location and name of another file, then hit <CR>.

The previous file (in the upper window) will save to disk, then the new file will be read. Now hit Esc. Lo and behold, the second file will appear in the lower window, while the original file remains in the top window. Now it is possible to work with either one. Either can be scrolled, edited, and otherwise revised independently of the other. Whichever window has the cursor will respond to your commands. To move the cursor into the other window, hit F2, then cursor.

Perhaps more important, with two windows you can move text from one file to the other. How to do this?

Mark by placing cursor at beginning of text to be moved, and hitting Control-F6 (for line) or F6 (for character or word). When text is marked, hit F4 to delete. Now press F2. This will return the cursor to the ruler line. Using arrow, move cursor into other half of window and position where you wish the text inserted. Hit Control-F4 to put the text in place. Now hit F5 to exit from the marking mode and to resume normal editing.

To return to a single document on the entire screen, place the cursor on the window you wish to retain and hit F2 twice.

You Can Insert An Entire File In Another file:

Place the cursor in the position desired. Now press Control and F3. The tag line on the

Continued On Page 170

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Freeware

Continued From Page 168

top will ask you to enter the location and name of the file to be inserted. After entering the information, hit <CR>. The file will be read in. To make the change permanent, hit F1 and F3.

To make a disk copy of a selected portion of larger file (for temporary storage, possible transfer to other disk, for separate printing, etc.):

Start once again by marking the excerpt with Control-F6 or F6. Now hit F3. Note that cursor is blinking on filename. Now type in a new drive and file name for the excerpt, and hit <CR>. That will do it. Remove marking by hitting F5.

Now you know the basics of editing text. All your work was done only in internal memory. To print or otherwise use your work, you need to copy it to the diskette.

The F1 key handles this chore. To save your work to disk B, follow this procedure:

Hit F1 followed by F3. That will write the file that is on the screen to disk B. You should do this often while you are working, so that incase of a crash, you will have most of your work saved onthe disk. Whenever you pause for breath, hit F1 and F3. When the electricity fails, you will still have all the completed work up to the last time you saved to disk.

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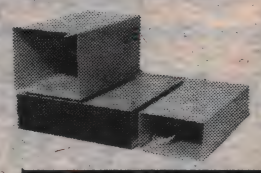

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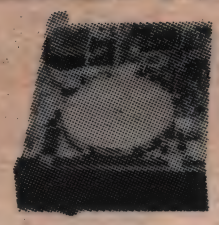

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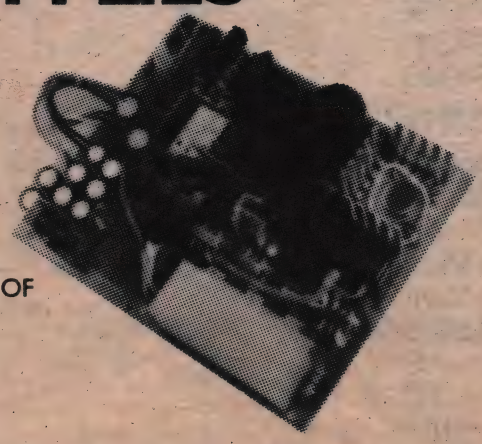

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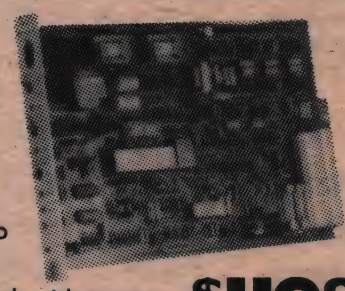

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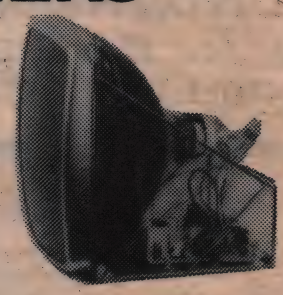

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Upgrading TI 99/4A
Continued from page 60

very little use of the cassette interface on most expanded systems. Also, having the main system elements in the PBox eliminates one power supply and the flex cable interface; allowing us to exploit a larger addressing space that could not be provided by the flex cable. Our design is not for game-playing but for the serious computer user.

CPU Board specs: The CPU board will contain a TMS 9995 running at a full 12 MHZ clock speed, with 64K initial RAM with expansion capabilities to 512K. In addition to the expanded RAM, 3 interrupt levels will be provided on the bus (a non-maskable interrupt, and level 1 and level 4 interrupts.) DMA control lines will be available on the CPU board for high-speed peripherals. Wait state generation logic will be present to handle GROM cycle timing.

I/O Board Specs: Instead of the TMS 9918A VDP we are opting for the TMS 9118 VDP, which is 100% software compatible with the 9918A and allows us to use just 2 memory chips (4416-style.) The 9901 PSI, 9919 Sound Generator chip, and the System ROM's and GROM's will be present on this board, with provisions to install additional ROM's with the capability of booting under control of a different ROM for a new Operating System.

9900 Architecture notes. Due to the design of the 9900 family, the largest program can only address 65K bytes. This is because this is the largest value that can be sorted in any of the registers on the CPU. Any additional memory above and beyond 65K needs to be implemented in segments of mapped memory using special hardware and software. Provisions are being made to allow for mapped memory on the CPU board, but new software will be needed to take advantage of the extended addressing provided; also this mapping gives us an opening to allow for multitasking to be accomplished. At this time however, we are concentrating on getting a standard /4A environment up and running - we'll worry about the bells and whistles later.

Due to the lead times involved in coordination of the hardware design and the deadlines here this series will run on a bi-monthly basis. Even with the rumors of other 99/8 clones milling about we still intend to complete our project barring any unforeseen events. In future installments we will shift to other hardware improvements to complement current and new 9900 based machines and keep you up to date on our progress. ●

Videx Videoterm
Continued from page 60

directly without going through the built in EPROM routines.) We're going to remove the EPROM electrically under the control of the SPST switch. Should you have to use one of the #$%!! programs, you simply flip the switch before booting the program and when you boot it, Pascal and the program will ignore the Videoterm and soft switch. Should you want to use the Videoterm for another program you flip the switch back to normal.

Remove the EPROM carefully with the IC puller. Gently bend out pin 24 of the IC. If you hold the IC so that the pins point down and the notch faces directly towards you, then pin 24 will be the one on the left closest to you. Wrap one end of the wire wrap wire around the bent pin and solder the wire to the pin GENTLY!! Make sure you don't overheat the IC. Putting too much heat or solder onto the pin will destroy the EPROM. Solder the other end of the wire to one of the terminals of the switch. Take the solid wire and push one end into pin 24 of the socket which you removed the EPROM from. Bend it down at a 90 degree angle away from the socket (see illustration). Solder the other end of the wire to the other terminal on the switch. Put the EPROM back into the socket over the wire. You may wish to put a piece of electrical tape between the wire and pin to make sure that they don't short. Reassemble your Apple making sure to leave the switch where you can easily access it.

Continued on page 173

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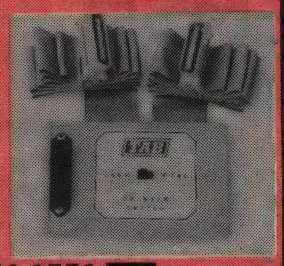

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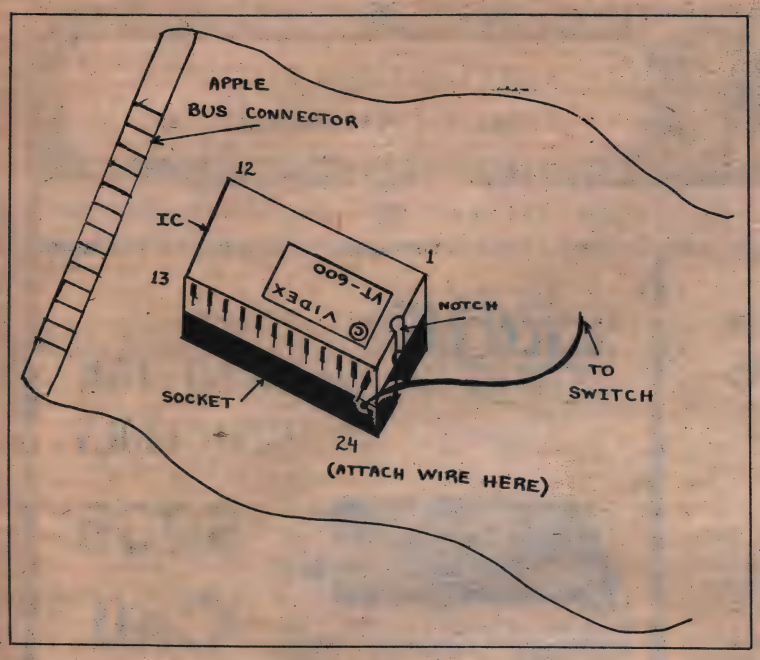
Videx Videoterm Continued from page 172



While remembering the disclaimer on the first page of this article, turn on your Apple. Should you hear clicks from the power supply or see smoke, turn off the Apple and find out what you did wrong.

With the switch closed, the card will operate normally. If you need to run one of the #$%!! programs flip the switch to the open position before booting the program and it will work. Only open the switch for programs where you see a blank screen instead of the text that the manual tells you to expect. Programs that state they won't work with an 80-column card or external terminal installed in slot three will now work. As a general rule, most programs that you have to open the switch will have a label with a copyright notice that looks something like "UCSD Pascal operating system and Pascal 1.1 (c) 1980-1983 by Apple Computer Inc." When booted, the programs will clear the screen with inverse " a "s, turn on the Videoterm and leave you with a blank 80-column screen with a cursor in the top left.

After using this method to run your program, write a letter to the software manufacturer that wrote the #$%!! program. Ask them to revise their software to allow it to work in 80-column mode or at least not turn on the soft switch. Who knows. . .with enough letters the company may actually do something.

Another Method

What! You say that the above method isn't good enough? You don't like the dangling switch hanging outside your Apple? You say that you'd rather use the old "hard switch" instead? You want a better method? You think I should stop asking these rhetorical questions and tell you how?

Obtain a micro test clip (Radio Shack part number 270-370). As before bend out pin 24 of the EPROM and solder one end of the wire wrap wire to it. Solder the other end of the wire to the micro test clip. Clip the clip to pin 11 of the 9334 or 74LS259 on the soft switch (which should be in socket F14 of the Apple motherboard). If you have an Apple //e then instead of soldering the wire to the test clip, solder the wire to pin 13 of a 16 pin wire wrap socket and plug it into the internal game I/O socket. Then plug the EPROM back into the Videoterm card and reinstall the card.

If you have an autostart ROM (which most Apples have built in) the Videoterm card will be available, although turned off, when your Apple is powered up. If your Apple goes into the monitor (* prompt) when you turn it on, (the old F8 ROM marked F8-04) then type "C05D" to activate it, or POKE -16291,0 before typing "3 CTRL-P" or "PR#3". To deactivate the card, hit reset when you turn on the Apple before the diskette boots. You should see the BASIC prompt (] or>). Type "POKE -16292,0 to deactivate the card and then "PR#6" to boot the disk in the drive. Type "POKE -16291,0" or hit ConTRoL-RESET to reactivate the card.

W*A*R*N*I*N*G! Typing the POKE to shut off the card, either from command mode or within a program, will hang the Apple if it is done while the card is in use. Some copy-protection devices that fit in the Game I/O will do this. It is possible that some programs may also do this. As long as the program only uses the 40-column mode, it shouldn't affect you though.

How it works: If you're the type of person that doesn't know how to open the hood of your car and doesn't care, then GOTO the final paragraph.

As with the above method, the EPROM is disabled. The 2708 EPROM used by Videx with the terminal routines requires +5 volts on pin 24 to operate. If that power source is disconnected, then the EPROM, and therefore the card ceases to exist as far as most programs are concerned. Pin 13 of the Game I/O and Pin 11 of the 9334 (74LS259) are part of the AN2 circuit. The annunciators are +5 volt "switches" that can be turned on and off under program control, similar to the graphics modes. In fact, AN0 is used by the soft switch to select 40 and 80 column modes. AN2 was chosen because most devices don't use it, and a RESET, with the autostart ROM, turns it back on. The POKE is sensed by the 9334 which sets the line to line to high or low as needed.

With the simple de-select wire installed, never again will you have to drive yourself crazy when the program manual states "will not work with an 80-column card installed." ●

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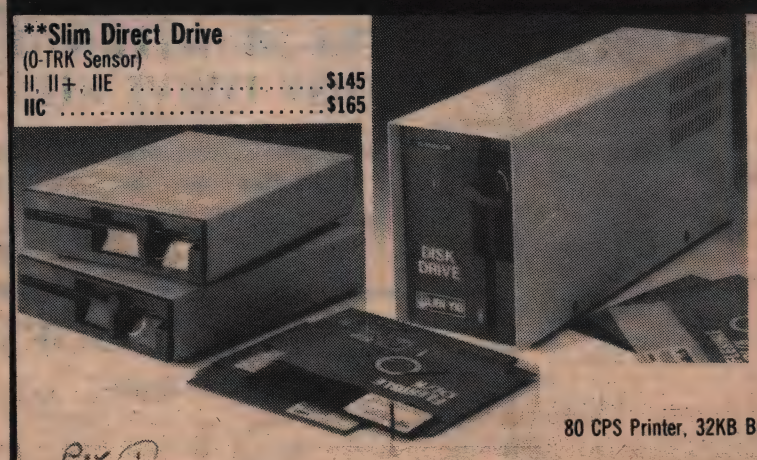

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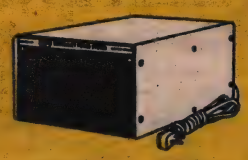

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Randy's Ravings
Continued From Page 60

new (2.2) ver. had same problems as above.

7. 1½ months later (Christmas Day) powered up and drives now run ALL the time! Still reads/writes OK (red lights on only during accesses) but spins my 3 Teac 55/B's as long as the console is on!! Needless to say, I called yet again and set a new blood-pressure record for a living being!!! This time, I talked to a technician by the name of Mike. He says will send yet another card bench tested and burned in. 2½ wks. later I still don't have it! Called once more on Fri. (1/27) but everyone was out to lunch. Secretary said someone would call me back in PM. Naturally, not only do they not send cards promptly, but they didn't return my call yet either!!!

It's a Dirty Shame that these folks can't get their act together. When working properly, the disk manager program alone is worth the $150, let alone the DSDD capability. Hope other user's cards NEVER go bad or they could be in for a very frustrating experience.

Then a week later I got this updated report on the state of things at CorComp from Jim during his visit there:

This is an update to the "CORCOMP CRAZINESS!!!" message I left before going to California. I happened to take my bad disk controller card to CorComp for the needed repairs while I was there. Luckily, I had the opportunity to speak with Jackirae Sagouspe, President of CorComp Inc. I related to her the same stuff as my previous message. She informed me of several things:

1. She is definitely aware of *ALL* the troubles with quality control, and attribute them to a too quick release of the product without enough standard testing procedures.

2. Their financial position is in much better shape, and recently profitability has returned. Reasons cited were: the discovery of a bad supply of the Western Digital controller chips, new PC-board design (Ver 2.3), a new version of the Disk Manager software (also 2.3), longer and more comprehensive "beta-testing" by folks with "full-blown" systems to help resolve compatibility problems associated with different console versions and third-party hardware schemes and a more intensive "burn-in" of each board before shipping.

3. Some problems with the early RS232 cards were mentioned to also be now under control.

4. They will soon have a *DIRECT* message exchange via Compuserve's TI Forum and The Source's TEXNET. added in Scofield's place, Mike Norton.

6. The 99000 (note 3 zeros) expansion system has been aborted! Efforts have instead been directed at producing the 9900 mini-expansion, which she says is being shipped now, without the problems associated with the card.

7. Utmost efforts will be made to fix the problems that Randy, myself and surely others have had.

8. The future holds interesting developments, not the least of which is their entry in the software market. Try as I might, I couldn't get a breath of any specifics for future hardware or software. One of the biggest problems with the computer industry today is "VAPOR-ware", soft or hard and it's her firm intention not to again put the pistol to the heads of the marketing division by any type of premature announcements or rumors before the products are ready to market. All in all, I was very favorably impressed with the attitude and plans for the future. I'm sticking with 'em and will continue to report bad and good experiences to the Forum. Oh, by the way, the card works just fine! (we'll see if it passes the test of time.)

Only the future will tell, but from the above report things may by looking better for all TI 99/4A owners with CorComp equipment.

Auto-Spell-Check Update. I just received an updated version of the 99/4A Spelling checker from **Dragonslayer ASC** (2066 Ponderosa Drive, Omaha, NE 68123.) Version 1.1 has up to 3 times the speed over the original version--and that's a BIG improvement! If you held off getting it I STRONGLY recommend that you get the new release.

A Forth Goodie. Many of you have asked for some info on some Forth programs. Well, I haven't really dabbled all that much in Forth as of late but I did run across a useful utility which you might find very handy. This utility comes from Jeff Young of Brooklyn NY and allows a Forth program to read and write Display/Variable 80 files back and forth from Forth screens. The Forth code listing provides a help facility that explains how the utility works.

Next Month: A new disassembler for the 99/4A which produces assembler source code and other new items for and about the users of TI computers. ●

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MIN     EQU     >8646       ;MINUTES (00-59)
HRS     EQU     >8648       ;HOURS (00-23)
DOW     EQU     >864A       ;DAY OF WEEK
                            (0=SUNDAY...
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DAY     EQU     >864C       ;DAY (00-31)
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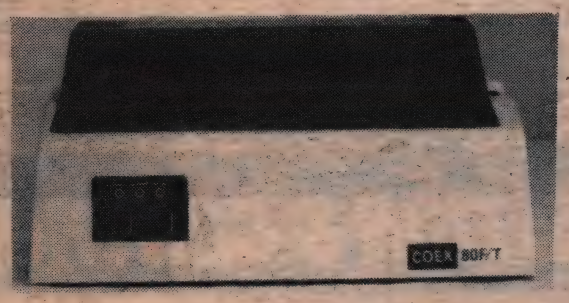

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If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

March 29-31, 1985
New York Personal Computer Show will be held at Madison Square Garden, New York. For more information call Kengore Productions at (201) 297-2526.

MARCH 28-APRIL 2,1985
The 10th Annual West Coast Computer Faire will be held in Moscone Center in San Francisco, CA. For more information call ComputerFaire office.

MARCH 31-APRIL 3, 1985
Softcon will be held in the Georgia World Congress Center in Atlanta. Over 850 exhibitors are expected. For more information, call or write Softcon, c/o Northeast Expositions, 822 Boylston Street, Chestnut Hill, MA 02167 (617)739-2000.

APRIL 1985

APRIL 2-4, 1985
GULF COMPUTER AND OFFICE SHOW will be held at the Rivergate Convention Center in New Orleans, LA. For more information, call 504-467-9949.

APRIL 6-7, 1985
FORT WORTH COMPUTER FAIR will be held at the Amon G. Carter Exhibit Hall (Will Rogers Complex) in Fort Worth, TX. Admission is $3 (Accompanied kids under 12 FREE). Hours are 10am-5pm. For more information, call (817)732-1194.

APRIL 10-13, 1985
MIL '85 INTERNATIONAL EXHIBITION OF BUSINESS SOFTWARE will take place in Cannes, in Southern France. This exhibition will be the first major international software show in Europe. For more information, write Commissariat General, 179, Avenue Victor Hugo 75116 Paris, France.

APRIL 14-18, 1985
NATIONAL COMPUTER GRAPHICS ASSOCIATION will be held in the Dallas Convention Center, Dallas, TX. Call the National Computer Graphics Association 703-698-9600 for more information.

APRIL 18-19, 1985
NETWORK MANAGEMENT/TECHNICAL CONTROL will be held in the Marriott Copley Place, Boston, MA. For more information, call Judie McDaid, National Sales Director, 305-737-9059.

APRIL 25-28, 1985
4TH ANNUAL NEW YORK COMPUTER SHOW will be held in Nassau Coliseum in NYC, NY.

APRIL 25-28, 1985
The San Diego Byte Show will be held in the San Diego Convention Center in San Diego, CA. For more information call the InterFace Group at 617-449-6600.

APRIL 25-28, 1985
4TH ANNUAL VIRGINIA COMPUTER SHOW to be held in the Pavilion Convention Center, Virginia Beach, VA. Call CompuShows 1-800-368-2066.

APRIL 26-28, 1985
PRODUX 2000 WHOLESALE EXPO '85 will be held in the Philadelphia Civic Center. For more information, call 1-800-523-3882. In PA, call 215-457-2301.

APRIL 26-28, 1985
THE ST. LOUIS COMPUTER SHOWCASE EXPO will be held at the A.J. Cervantes Convention Center in St. Louis, MO. For more information call the InterFace Group at 617-449-6600.

APRIL 26-28, 1985
The Dayton Hamvention will be held in the O'Hare Arena in Dayton, OH. For more information call 513-223-0923.

APRIL 26-28, 1985
The Great Southern Computer Show will be held in Columbia, South Carolina at the Carolina Coliseum. For more information call Great Southern Productions at (904) 356-1044.

APRIL 27-MAY 1, 1985
SPRING '85 CONFERENCE will be held in Louisville, KY. For more information, contact COMMON, Spring '85 Conference, 435 North Michigan Avenue, Suite 1717, Chicago, IL 60611 (312)644-0828.

MAY 1985

MAY 15-19, 1985
The Washington, D.C. Byte Show will be held in the Washington Convention Center. For more information call the InterFace Group at 617-449-6600.

MAY 18, 1985
THE 8TH ANNUAL SHOW & TELL MICROCOMPUTER CONFERENCE will be held at the University of Oklahoma in Norman, OK. The conference brings together microcomputer buffs of all ages and degrees of expertise. For more information and application forms, send a self-addressed, stamped envelope to Show & Tell Computer Conference, Richard V. Andree, O.U. Math Dept., 601 Elm, Norman, OK 73019.

MAY 19,1985
The Iliana Repeater System 16th Annual Hamfest will be held in the UAW Civic Center. For more information call Barbara Tolson at 217-662-8948.

JUNE 1985

JUNE 17-19, 1985
THIRD ANNUAL PC EXPO CONFERENCE PROGRAM will be held in the New York Coliseum. There will be over 35 sessions covering pertinent information for both the volume corporate buyers and volume resellers. For further information contact PC Expo, 333 Sylvan Avenue, Englewood Cliffs, NJ 07632.

NOVEMBER 1985

NOVEMBER 10-13, 1985
The Ninth Annual SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE will be held at the Baltimore Convention Center. It will offer a forum for professionals from both the health care and computers fields to come together, to listen to exchange ideas, to learn from each other and to leave with some new insight into solving problems in medical computing. For further information contact SCAMC, The George Washington University Medical Center, Office of Continuing Medical Education, 2300 K St., N.W., Washington, D.C. 20037.

Mr. Pixel's Programming

Continued from page 54

it's color and size. The crayons only move in eight directions; N, NE, NW, S, SE, SW, E and W. There is no inbetween, as is found in LOGO programs. The crayons are limited to four colors; red, green, blue and white. The fill command will let you use combinations of these colors within a fixed area.

One icon lets you move the crayon without making a line. Mr. Pixel's PPS has some of the standard commands you find in other drawing programs; fill, mirror, repeat (copy), rotate and erase.

But it has one command that sets it apart from other drawing programs. Like LOGO, PPS has a LIST function. This command will show you a listing of the steps you've used to create your drawing. You can then go in and edit these steps to modify what you've drawn. Supposedly, this demonstrates to children principles of programming. By changing certain steps it's possible to drastically alter your picture.

Like all good programs of this type, drawings can be saved to or loaded from disk. A special function is included to rewrite the drawing as a background file for use with Mr. Pixel's Cartoon Kit.

Although a print function is included in the icon map, I was unable to get it working with my printer and interface. All I got was a steady string of form feeds. There are NO instructions at all for interfacing a printer and the manual makes NO mention of which printers will work.

The Cartoon Kit is a quaint little program that is mildly amusing. You use the joystick and menu controls to move some sprites (which you can design yourself) around the screen. You are allowed up to three sprites in each cartoon. As mentioned earlier, you can use the backgrounds you've created with Mr. Pixel's PPS to set the scene. The disk samples

Continued on page 178

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Mr. Pixel's Programming
Continued from page 176

for this program are really nice. They illustrate what is possible with a few days of hard work.

The sprite design section is at least done properly. Using the joystick to directly control the cursor, you use the fire button to color in the pixels. The familiar four crayon colors are in boxes at the right, so you can change the drawing color. Sprites can be made in two sizes.

Each "player" in your cartoon is actually made up of four very similar sprites. By cycling through these four parts, the "player" appears to be moving. In the design mode, you can update all or just some of the sprites. This is a very convenient feature, as it saves you having to change each part individually.

Once you've designed your sprites, though, you have to go back to the menu driven controls. The CK treats your creations like videos on a tape deck. You can play them forward or backward, normal speed or one frame at a time. There is a rewind icon, to move your cartoon back to the start. This feature works much faster than on a video deck.

The three possible sprite characters you've chosen to use are displayed in boxes in the icon menu. You pick which one you want to move by placing the cursor on it and hitting the fire button. Using the eight arrows in the direction icon "programs" your figures to move where you want them to go.

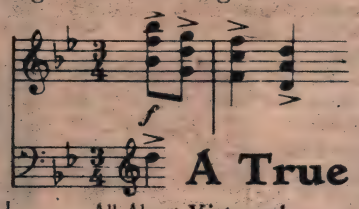
A flip icon changes the direction in which your figure appears to be "looking." There is also a speed control. A hide control allows you to move the icon about on the screen without it being seen. This can be used to make things appear "out of thin air."

Because there aren't as many icons to use for this program it isn't nearly as cumbersome to use as PPS. It still would be nice if the icon menu wrapped around at the ends.

Both of these programs make some pretty big claims on the front covers of their documentation. The PPS cover claims "Helps children develop computer programming skills as they have fun creating designs and drawings." The CK cover says "Helps children develop logical thinking skills as they experience the magic of creating cartoons." Both note at the bottom that "You supply the imagination. We supply the tools." Perseverance and determination will get you a lot farther than imagination in using these packages.

The concept behind the programs is great; the execution however, isn't. The programs are cumbersome to the point of being very unwieldy. I never thought I'd see the day when a joystick could become such an instrument of torture. Initially, I thought the problem might just be my age. After all 27 is a little on the high side of eight and up. But then I got a

Continued on page 179



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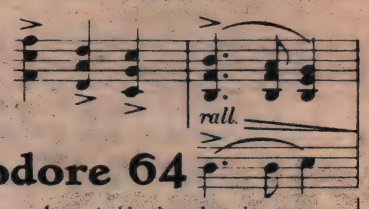

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Mr. Pixel's Programming
Continued from page 178

few of my dedicated software testers to try the programs. They didn't last for more than a few minutes, once they understood how the programs worked. One of them even volunteered to go home early, and that's unheard of. So much for the "as they have fun" and "experience the magic" parts of the claims.

As a drawing program, PPS is a washout. There are too many other programs that give artists much more flexibility. As a learning program, it isn't much better. My experience has been that kids learn from activities they enjoy. And PPS is far from enjoyable.

CK on the other hand, isn't too bad. With the animated figures next to the block where you create your sprite, you can see what effect your changes are making. The menu however isn't much better than that in PPS, so when you start trying to move your sprites around on the screen things get cumbersome again.

All in all, I can't see that either of these programs are worth the price. If you can get them at a discount for $20, maybe. ●

Building a Parallel
Continued from page 54

The handshaking features of the IA chips make them easy to use for a Centronics interface. Whenever a byte is output, to Port B of a 6522 VIA, the "CB2" line automatically strobes low for a cycle. The 6526 works the same way with the "PC" line doing a low strobe on a "Port B" write. We use this to interface to the Centronics "data strobe" line. This line tells the printer that a new byte is being output to it.

Unfortunately, Commodore didn't see fit to connect both of these chip lines to the same User Port connector pins. Instead, they hooked up the "PA2" line to the User Port "M" connector on the 64 instead of a strobe line, as you can see. To compensate for this, we can merely pulse PA2 low after writing a byte to Port B and get the same effect. I wish they would have wired them up both the same, though. That would have made it more "automatic" and required a little less software.

The "CB1" and "FLAG" lines work the same way, only in reverse. The printer sends up its "ready" signal through these. This tells us when its O.K. to output another data byte.

The Programmer's Reference Guides gives us all the details on how the different I/O chips work. You can understand a lot about their operation from reading the chapters in the Guides.

There are several other possible hardware configurations that would do the same job, some with added features like buffering and bus switching. But I tried to design an interface with these objectives in mind:

—Lowest cost possible.

—Using readily available parts (locally obtainable if desired).

—Simple construction, no special equipment needed to build.

—Highest reliability possible.

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Continued from page 180

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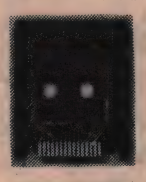
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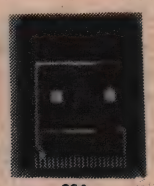
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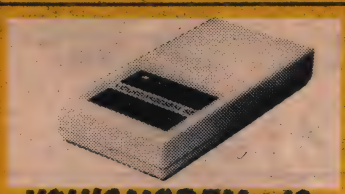
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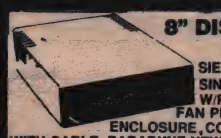
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Building a Parallel
Continued from page 179

usable, feel free to improvise. I'm merely laying out the design that I have been using for several months. It works just fine, is very reliable, and is meant to be a guide for your own project. What I am saying, is that this interface works, has little to go wrong with it, and is fairly easy to build. That's what I think most people are interested in. Like all circuits, however, it can be improved. If you think you have a significant improvement on it, please share it with me and maybe we'll publish it in the Computer Shopper.

Shopping For An Interface

Now that you've gotten a good overview of the interface, let's get to the construction details. You'll probably need to do a little shopping for the parts.

Here's a list of what you'll need to build the interface. I have included the approximate equivalent Radio Shack part numbers where possible:

As you can see, almost all the parts needed for the project are available at Radio Shack. Each of these items could also easily be obtained mail order from several suppliers that advertise in the Shopper.

At least one item will have to be procured from somewhere besides Radio Shack. That's the 34 pin header. Radio Shack used to carry a 40 pin header that you could break down into a 34 pin, but they've since discontinued all of their headers. (Radio Shack always seems to discontinue the parts you need the most. Sounds like Murphy's Law is involved.) You might be able to find an old Radio Shack header around somewhere, so I've included the part number. Fortunately, the 34 pin header is a common part and is easily available through mail order suppliers.

If you can find it, buy a 12/24 pos. card socket (on .156" centers) instead of the 22/44 that Radio Shack sells. You will have to cut the 44 pos. socket down to 12/24 positions for the User Port if you don't. (Arnold Company, 214 Mill Lane, Red Oak, Texas 75154, sells the right connector for $2.25 ea. + $3.00 shipping per order. Go in with a friend and save. You also might want to look at the JAMECO, JDR Microdevices, and ALTEX Electronics ads, among others.)

I recommend that you buy the Model 100 printer cable specified above unless you happen to have a male Centronics ribbon connector, ribbon cable, and 34 pin IDS socket laying around. Even if you do, assembling those components is difficult without the proper tools. The $15.00 Radio Shack gets for them is reasonable and the 5' length is about the most you will normally need. Yet, if you want, you can make, or have made, a custom cable with the right connectors on each end. Don't exceed a 10' length on the cable or the interface may not work properly.

You will have to cut down the 44 position "experimenter" breadboard PC card since 12/24 versions are not made (to my knowledge). I recommend that you wait until all the components are mounted on the circuit board before you trim it down. The accompanying diagrams should give you a good idea of how to trim it.

In addition to all this, you will need some wire for jumpers and a good quality rosin-core solder to hook it all together. I recommend solid wire about 20 gauge or so. Solid wire is stiff and is easier to handle when making small jumpers. Use insulated wire, too. There will be too much overlapping for simple bare or enamel covered wire. Use a good plastic sheathed version to prevent shorts between leads.

Continued on page 192

Description	Part No.	Price
44 Pos. Circuit Card (.156")	276-152	$2.99
44 Pos. Card Socket (.156")	276-1551	$2.99
34 Pin IDH PC Mount Dual Header	276-1540	$1.29 *
Model 100 Printer Cable	26-1409	$14.95
(34 pin socket to 36 pin male Centronics 5')		
Misc. Wire for short jumpers		
Solder		

* (Discontinued Item - Obtain from mail order supplier)

```
 REM SIMPLE CENTRONICS PRINT DRIVER
10 REM COPYRIGHT (C) 1985 BY T.DRUDE
12 PRINT CHR$(147);CHR$(13);" LOADING DRIVER INTO RAM ..."
14 FORI= 49152 TO 49432 :READ DA:POKE I,DA: CK=CK+DA: NEXT I
15 PRINT CHR$(147);CHR$(13)
16 IF CK<> 34498  THEN PRINT "ERROR IN DATA STATEMENTS !": END
18 PRINT " USE SYS 12*4096 TO ACTIVATE"
20 PRINT " OPEN PRINTER WITH DEVICE #2 "
21 PRINT " EX: 'OPEN 128,2' "
22 DATA162,19,189
24 DATA12,192,157
26 DATA26,3,202,16
28 DATA247,96,32,192
30 DATA115,192,142
32 DATA192,165,192
34 DATA51,243,189
36 DATA192,201,192
38 DATA237,246,13
40 DATA193,47,243
42 DATA166,184,208
44 DATA3,76,10,247
46 DATA32,15,243,208
48 DATA3,76,254,246
50 DATA166,152,224
52 DATA16,144,3,76
54 DATA251,246,230
56 DATA152,165,184
58 DATA157,89,2,165
60 DATA185,141,26
62 DATA193,9,96,133
64 DATA185,157,109
66 DATA2,165,186,157
68 DATA99,2,201,2
70 DATA240,3,76,114
72 DATA243,169,255
74 DATA141,3,221,173
76 DATA0,221,9,4,141
78 DATA0,221,173,2
80 DATA221,9,4,141
82 DATA2,221,169,16
84 DATA141,13,221
86 DATA24,96,32,20
88 DATA243,240,2,24
90 DATA96,32,31,243
92 DATA138,72,165
94 DATA186,201,2,240
96 DATA3,76,157,242
98 DATA104,32,242
100 DATA242,24,96
102 DATA32,15,243
104 DATA240,3,76,1
106 DATA247,32,31
108 DATA243,165,186
110 DATA201,2,240
112 DATA3,76,25,242
114 DATA76,10,247
116 DATA32,15,243
118 DATA240,3,76,1
120 DATA247,32,31
130 DATA96,165,153
132 DATA201,2,240
134 DATA3,76,87,241
136 DATA76,10,247
138 DATA72,165,154
140 DATA201,2,240
142 DATA4,104,76,202
144 DATA241,142,25
146 DATA193,104,32
148 DATA240,192,201
150 DATA13,208,12
152 DATA174,26,193
154 DATA240,7,169
156 DATA10,32,240
158 DATA192,169,13
160 DATA174,25,193
162 DATA24,96,72,173
164 DATA13,221,41
166 DATA16,240,249
168 DATA104,141,1
170 DATA221,173,0
172 DATA221,41,251
174 DATA141,0,221
176 DATA9,4,141,0
178 DATA221,173,1
180 DATA221,96,165
182 DATA153,201,2
184 DATA240,3,76,62
186 DATA241,76,10
188 DATA247

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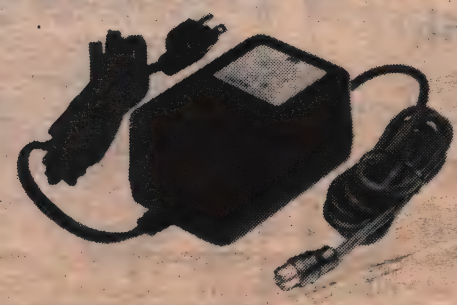

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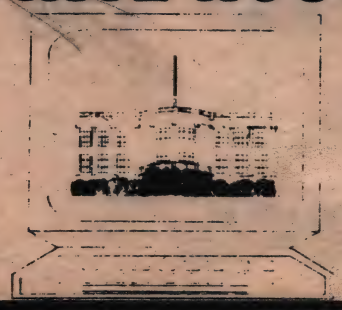

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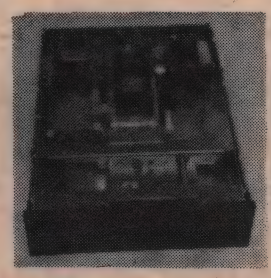

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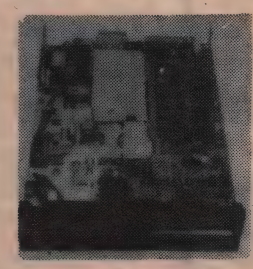

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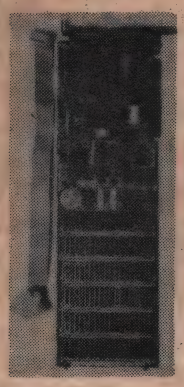

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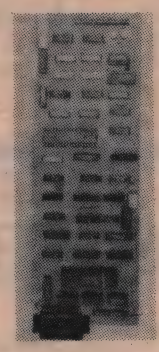

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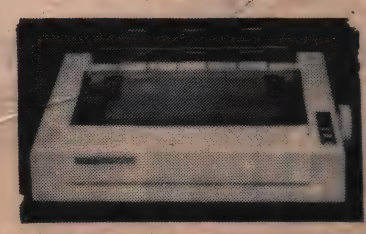

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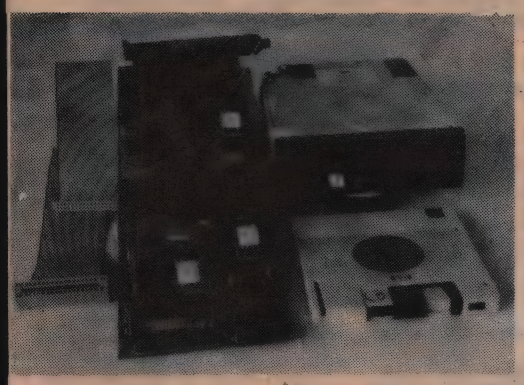

* High reliability
* Controller included
* Expand to virtually unlimited capacity with these 5 Megabyte cartridges
* Fits into one of your disk drive slots
* Directly bootable
* Additional cartridge (5 Mbyte = $120)

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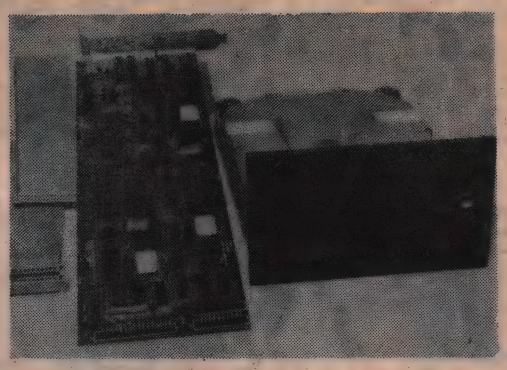

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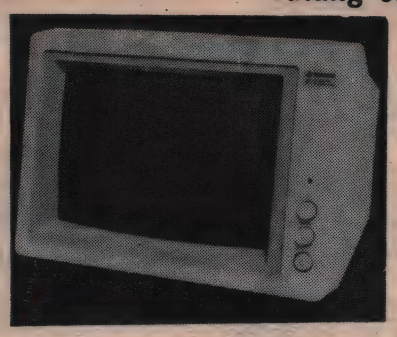

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* 13" dot in line 640 x 400 (H x V)
* R.G.B. input TTL level positive
* includes cable

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* 12" clear green/ amber monochrome screen
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* Ultra high resolution color/graphics
* Works best with TAXAN 440

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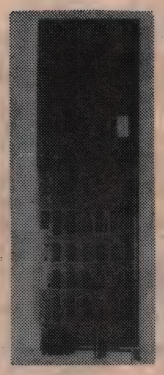
* Buy both BOB Card and Taxan 440 for $950

Super Color Card



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* 2 graphics modes:
  4 color 320 x 200
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(Based on IBM PC/XT compatible Super Computer)
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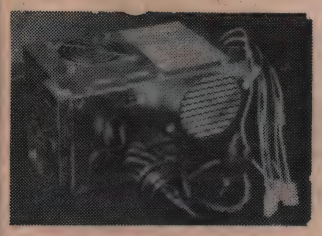

* High speed fan
* Hard disk ready
* Convertible to 220 VAC
* Same dimension with IBM PC/XT power supply

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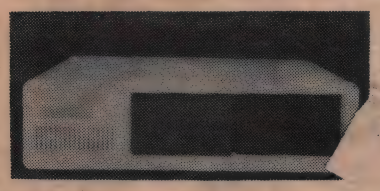

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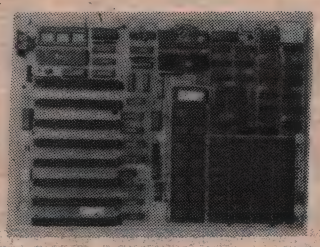

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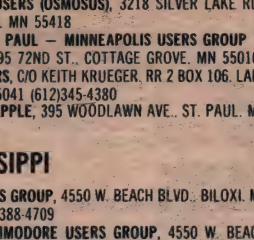

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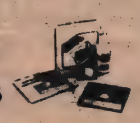

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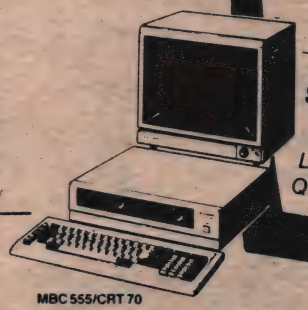
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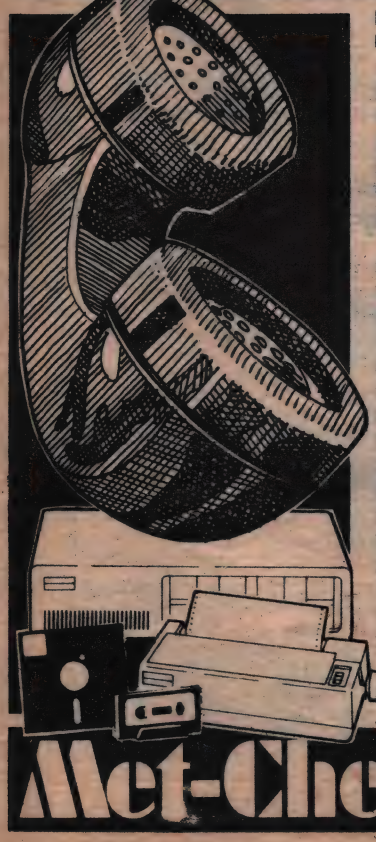

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WINCHESTER DRIVES		
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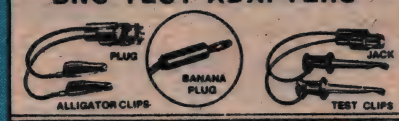
MODEL-ft.	1-9	10-24	25
MLF16PP-0.5	3.30	3.00	2.84
MLF16PP-1	3.60	3.28	3.10
MLF16PP-2	4.20	3.82	3.61
MLF16PP-3	4.80	4.37	4.13
MLF16PP-4	5.40	4.91	4.64

BNC TEST ADAPTERS



MODEL	TYPE	TERMINATION	1-9
BC30	Plug	Banana Plug	7.75
BC40	Plug	Test Clip	6.95
BC50	Plug	Alligator	7.10
BC60	Jack	Banana Plug	5.75
BC70	Jack	Test Clip	6.95
BC80	Jack	Alligator	5.75

Order 10 each type - DEDUCT 10%

OUR SPECIALTY

CUSTOM RS-232 ADAPTERS

Few or OEM Qty

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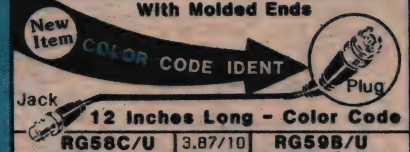


12 Inches Long - Color Code

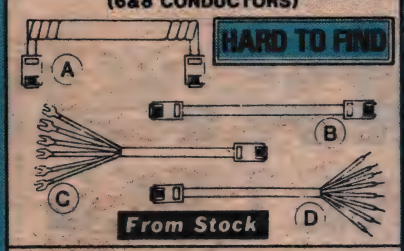
RG58C/U MODEL-Color	3.87/10 3.66/25	RG59B/U MODEL-Color
CC58CX-Blue	$4.25 Each	CC59BX-Blue
CC58CX-Green		CC59BX-Green
CC58CX-Orange		CC59BX-Orange
CC58CX-Yellow		CC59BX-Yellow

Color Mix OK for Quantity Pricing

PC Mounted BNC CONNECTORS —SILVER PLATED—

MODEL	TYPE	1-9	10-24	25
BAC-1422	PC	4.95	4.50	4.26
BAC-1500	RA	7.95	7.23	6.84

TELE-DATA CABLES (6&8 CONDUCTORS)



MODEL-ft.	Code	# Wires	1-9	10-24
TDC-001-6	A	8	3.95	3.48
TDC-001-10	A	8	4.95	4.36
TDC-003-2	B	8	2.95	2.60
TDC-003-7	B	8	3.55	3.12
TDC-003-14	B	8	4.85	4.27
TDC-003-25	B	8	6.95	6.12
TDC-027-7	B	6	2.95	2.60
TDC-027-14	B	6	3.85	3.39
TDC-027-25	B	6	4.95	4.36
TDC-004-7	C	8	2.95	2.60
TDC-004-14	C	8	3.95	3.48
TDC-028-7	C	6	2.55	2.24
TDC-028-14	C	6	3.45	3.04
TDC-005-2	D	8	2.25	1.98
TDC-005-7	D	8	2.95	2.60
TDC-005-14	D	8	3.95	3.48

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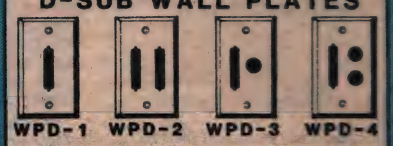
Blank MODEL WP $3.59
Supplied with Matching Screws

D-SUB WALL PLATES



	WPD-1	WPD-2	WPD-3	WPD-4
MODEL	Knockout		1-9	10-24
WPD-1	(1) D-25		3.95	3.75
WPD-2	(2) D-25		3.95	3.75
WPD-3	D & Coax		3.95	3.75
WPD-4	D & Coax		3.95	3.75

COAXIAL WALL PLATES

	WPC-1	WPC-2	WPC-4	WPC-10
WPC-1	(1) Coax		3.95	3.75
WPC-2	(2) Coax		3.95	3.75
WPC-4	(4) Coax		3.95	3.75
WPC-10	IBM Twinax		3.95	3.75

NOTICE: Wall plates have D-Holes to accept feedthru adapters as shown below. Prices are for plates only.

TELE DATA JACK 6&8 POSITION

MODEL	TYPE	POS.	1-9	10-24
TDD-22	Wall	8	7.50	6.60
TDD-26	PC	6	2.95	2.60
TDD-28	PC	8	3.95	3.48

MALE D-SUB HARDWARE

STD 4-40 SET

COMPARE PRICES

COMPARE

Multiples of 50 Only

MODEL	FINISH	50-450	500	1200
SDF-1	Chromate	.19	.18	.17
SDF-2	Tin Plate	.19	.18	.17

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- Fully Shielded
- AB or ABC Types
- Low Contact Res
- Mounting Flanges
- Metal Construction
- BNC or TNC & Wang
- Center conductor switches
- Shield isolation maintained

MODEL	FUNCTION	TERM.	EACH
DS12B	SPDT AB	BNC	65.00
DS22B	DPDT AB	BNC	79.00
*DS22BT	DPDT AB	BNC-TNC	85.00
DS13B	SPDT ABC	BNC	75.00
DS23B	DPDT ABC	BNC	94.00
*DS23BT	DPDT ABC	BNC-TNC	99.00

*For Wang Devices-Switches Transmit & Receive Cables Simultaneously

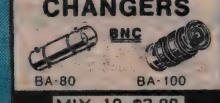
Qty. Discounts & Custom Types Available

RS-232 CABLES 25 CONDUCTORS

MODEL-ft.	1-9	10-24
C25-2.5	19.88	18.09
C25-5	21.16	19.26
C25-10	23.76	21.62
C25-15	26.36	23.99
C25-25	31.56	28.72

SPECIFY: Male-Male or Male-Fem

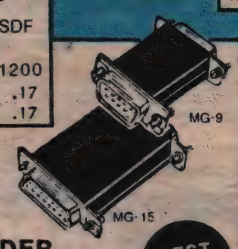
- POPULAR - GENDER CHANGERS



MIX 10 $2.80
MIX 25 $2.60

YOUR CHOICE 2.95

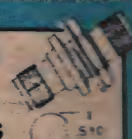
GENDER CHANGERS



BEST GRADE

MODEL	GENDER	1-9	10-24
MG-9F	F-F	15.95	14.51
MG-9M	M-M	15.95	14.51
MG-15F	F-F	18.95	17.24
MG-15M	M-M	18.95	17.44

CONNECTORS FOR L-com WALL PLATES

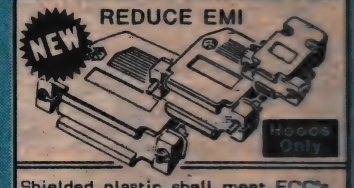


MODEL	TYPE	1-9	10-24
BA-1087	BNC	6.25	5.94
BA-2301	TNC	6.45	6.13

RS-232 D-SUBS

		1-9	10-24
SD-25P2	Male	3.65	3.47
SD-25S2	Female	4.85	4.61

METALIZED CONNECTOR REDUCE EMI



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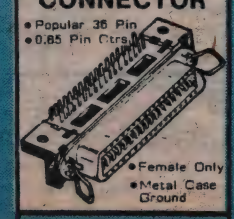
MODEL-SIZE	1-9	10-24	25
SDC- 9M	1.75	1.66	1.54
SDC- 15M	1.85	1.76	1.63
SDC- 25M	1.95	1.85	1.72

Supplied w/hdr - QTY pricing also

CENTRONICS RT ANGLE PC CONNECTOR

- Popular 36 Pin
- 0.85 Pin Ctrs



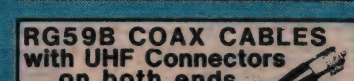
SCARCE ITEM

CEN36F-RA

1-9	10-24	25
8.95	7.88	8.50

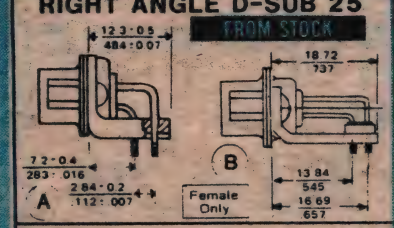
DEALER REQUESTS ATTENDED

RG59B COAX CABLES with UHF Connectors on both ends



MODEL-ft.	1-9	10-24	25-99
CB59B-1	3.55	3.23	3.05
CB59B-1.5	3.70	3.37	3.18
CB59B-2	3.85	3.50	3.31
CB59B-3	4.15	3.78	3.57
CB59B-4	4.45	4.05	3.83
CB59B-5	4.75	4.32	4.09
CB59B-10	6.25	5.69	5.38
CB59B-15	7.75	7.05	6.67
CB59B-25	10.75	9.78	9.25
CB59B-50	18.25	16.61	15.70
CB59B-100	33.25	30.26	28.60

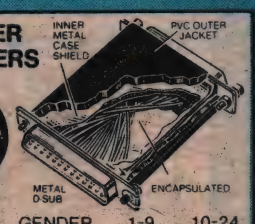
RIGHT ANGLE D-SUB 25



MODEL	TYPE	1-9	10-24	25
SD25S-RA	A	7.90	7.51	6.95
SD25S-R2	B	7.90	7.51	6.95

GENDER CHANGERS

BEST GRADE!



MODEL	GENDER	1-9	10-24
MG-25F	F-F	23.95	21.79
MG-25M	M-M	23.95	21.79

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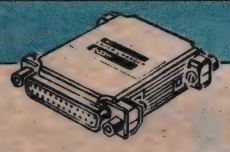
MODEL	Gender	1-9	10-24
DGS-36F	Female - Female	36.95	33.62
DGS-36M	Male - Male	36.95	33.62

RS-232 GENDER CHANGERS



Needed when RS-232 cables won't mate. Our DG Series are compact and feature trouble free PC Board construction and lower cost. Choice of shielded or unshielded. Always keep some for emergency needs. 25 up quantity pricing available.

MODEL	Gender	1-9	10-24
DG-25F	(F-F)Unshielded	16.95	15.42
DG-25M	(M-M)Unshielded	16.95	15.42
DGS-25F	(F-F)Shielded	18.95	16.97
DGS-25M	(M-M)Shielded	18.95	16.97

RS-232 DATA LINE MONITOR

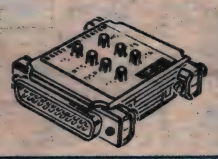
A miniature Data Line Monitor allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and Red LED's report the status of:

Transmit Data (TD) pin 2
Receive Data (RC) pin 3
Request To Send (RTS) pin 4
Clear To Send (CTS) pin 5
Data Set Ready (DSR) pin 6
Data Carrier Detect (DCD) pin 8
Data Terminal Ready (DTR) pin 20

MODEL	Description	1-9	10-24
DLM	Data Line Monitor	37.35	33.99

NEW Data Line Monitor now available with Red/Green LED's to indicate a Low, high or open position.

DLM-2	Data Line Monitor	46.95	42.72

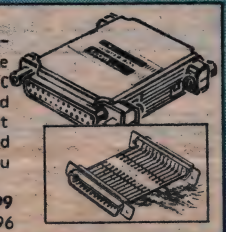


RS-232 SURGE PROTECTOR

Guard against voltage spikes entering your RS-232 ports. Metal-Oxide varisitors on lines 2, 3, and 7 clamp surges above 26 volts without affecting normal operating condition. This compact adapter mounts permanently in series, all 25 wires are wired through.

MODEL	Description	1-9	10-24	25-99
DSP	Surge Protector	24.95	22.70	19.96

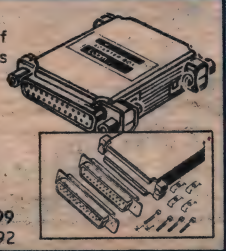
RS-232 DATA JUMPER BOX



A Data Jumper Box used to customize RS-232 interface devices. All 25 pins of the male and female connectors terminate to 25 solder pads. The PC Board is always wired to the D-Subs. Supplied with 25 wires already stripped for permanent wiring to suit your needs. Many interfaces could be built - Null Modems, Pin Reversers, - You name it!! Supplied with all hardware unassembled.

MODEL	Description	1-9	10-24	25-99
DJB	Jumper Box	22.45	20.43	17.96

RS-232 DO IT YOURSELF KIT

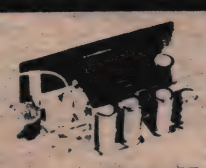


This Do It Yourself Kit allows the creation of many RS-232 variations. The following components are included in the assortment:

1 ea. Male 25 pin D-Sub Connector
1 ea. Female 25 pin D-Sub Connector
2 ea. Snap-on half covers (UL 94V0)
1 set Hardware for Male & Female Connectors

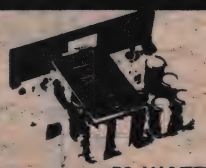
MODEL	Description	1-9	10-24	25-99
DIY	Do It Yourself Kit	13.65	12.42	10.92

THIS MONTH'S SPECIAL



30 WATT

SAVE 50%



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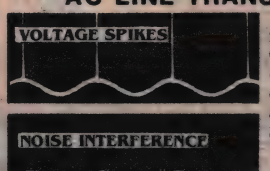
SWITCHING Single Output POWER SUPPLIES

FEATURES:
- Open Frame Construction
- Built-in EMI Filter
- Fused Input
- Converter Freq. 25 kHz
- 70% Efficiency
- Overload Protection (Auto recovery)
- Output Converter incl.

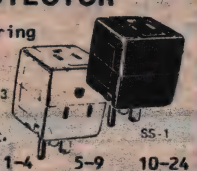
SPECIFICATIONS:
- Input: 115V or 230VAC
- Line regulation: ±0.15%
- Load regulation: ±1.0% max.
- Ripple & Noise: 1.0% max.
- Oper. Temp: 0° - +40°C
- Holdup Time: 25 millisec.
- Size: 30W - 2.17 X 3 X 5.92
  50W - 2.17 X 3.95 X 5.6

30 WATT MODEL	DC Volt-Amp	30W	Qty.	50W	50 WATT MODEL	DC Volt-Amp
0506	5V @ 6A	38.94	1-9	52.14	0510	5V @ 10A
122R5	12V @ 2.5A	35.40	10-24	47.50	1204	12V @ 4A
1502	15V @ 2A	32.45	25-99	43.45	153R25	15V @ 3.25A
241R25	24V @ 1.25A	29.50	100	39.50	2402	24V @ 2A
		MIXING ALLOWED				

AC LINE TRANSIENT SURGE PROTECTOR



- Prevents False Triggering
- Absorbs Spike & Noise
- Safe Voltage Level
- 2-Step Protection
- Rated: 15A @ 125VAC
- Polarized Gnd'd Recept.

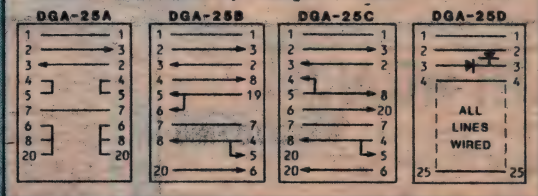


MODEL	# TAPS	1-4	5-9	10-24
SS-1	Single	10.95	9.75	8.65
SS-3	3-Way	12.65	11.26	9.99

RS-232 MODEM ADAPTERS

Eliminate need for modems when connecting local terminals or terminal to computer. Construction is the same as our DG Series. Pin connectors are shown in our code diagrams. If our standard won't do, we will configure to your specifications.

MODEL	Description	1-9	10-24
DGA-25A	Null Modem	16.95	15.42
DGA-25B	Null Modem	16.95	15.42
DGA-25C	Null Modem	16.95	15.42
DGA-25D	Polarity Changer	16.95	15.42



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- RFI Safety Proof
- Brushed Aluminum Panel
- Highest Grade Rotary Sw.
- 6 LED Monitor, Optional
- Size: 2.25" X 7.25" X 5"
- Full One Year Warranty

RS-232	12 Lines Switched	1-4	5-9
DTS2512-2	2-Way	99.00	94.05
DTS2512-3	3-Way	115.00	109.25
Switches - Lines: 2-6, 8, 15, 17, 20, 24, 25			
RS-232	25 Lines Switched		
DTS2525-2	2-Way	115.00	109.25
DTS2525-3	3-Way	130.00	123.50
CENTRONICS	25 Lines Switched		
DTS3625-2	2-Way	155.00	147.25
DTS3625-3	3-Way	175.00	166.25
Switched - Lines: 1-6, 18, 31-36, 19-30			
6 LED Monitor (Lines 2-6 & 20) Add 15.00			

L-com BNC COAXIAL CABLES ... FROM STOCK!

COMPARE PRICE * COMPARE QUALITY * COMPARE FEATURES * COMPARE SERVICE

MODEL-Ft	1-9	10-24
CC58C-1	3.55	3.23
CC58C-1.5	3.70	3.37
CC58C-2	3.85	3.50
CC58C-2.5	4.10	3.73
CC58C-4	4.40	4.00
CC58C-5	4.65	4.23
CC58C-10	6.05	5.51
CC58C-15	7.45	6.78
CC58C-25	10.75	9.33
CC59B-1	3.65	3.32
CC59B-2.5	4.00	3.64
CC59B-5	4.75	4.32
CC59B-10	6.25	5.69
CC59B-15	7.75	7.05
CC59B-25	10.75	9.78
CC59B-50	18.25	16.61
CC59B-100	33.25	30.26
CC62A-1	3.60	3.28
CC62A-2.5	3.95	3.59
CC62A-5	4.70	4.28
CC62A-10	6.15	5.60
CC62A-15	7.60	6.92
CC62A-25	10.50	9.56
CC62A-50	17.75	16.15
CC62A-100	32.25	29.35
CC174-1	3.60	3.28
CC174-1.5	3.75	3.41
CC174-2	3.90	3.55
CC174-2.5	4.05	3.69
CC174-4	4.50	4.10
CC174-5	4.80	4.37
CC174-10	6.35	5.78
CC174-15	7.90	7.19
CC174-25	11.00	10.01

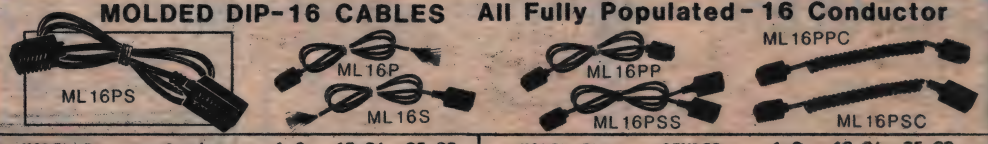
MODEL-Ft	1-9	10-24
RG-58C EXTENSION CABLES NOT STOCKED BUT MADE TO ORDER		
Shorter Lengths Made To Order		
CC59BX-5	4.95	4.50
CC59BX-10	6.45	5.87
CC59BX-15	7.95	7.23
CC59BX-25	10.95	9.96
CC59BX-50	18.45	16.79
CC62AX-5	4.90	4.46
CC62AX-10	6.35	5.78
CC62AX-15	7.80	7.10
CC62AX-25	10.70	9.74
CC62AX-50	17.95	16.33
CC62AX-100	32.45	29.53
RG-174 EXTENSION CABLES NOT STOCKED BUT MADE TO ORDER		

MODEL-Ft	1-9	10-24
CC58CX-1RA	4.90	4.46
CC58CX-1.5RA	5.05	4.60
CC58CX-2RA	5.20	4.73
CC58CX-2.5RA	5.35	4.87
CC58CX-3RA	5.50	5.00
CC58CX-4RA	5.80	5.28
CC58CX-5RA	6.10	5.55
CC58CX-7.5RA	6.85	6.23
CC58CX-10RA	7.60	6.92
CC59BX-1RA	4.90	4.46
CC59BX-1.5RA	5.05	4.60
CC59BX-2RA	5.20	4.73
CC59BX-2.5RA	5.35	4.87
CC59BX-3RA	5.50	5.00
CC59BX-4RA	5.80	5.28
CC59BX-5RA	6.10	5.55
CC59BX-7.5RA	6.85	6.23
CC59BX-10RA	7.60	6.92
CC62AX-1RA	4.90	4.46
CC62AX-1.5RA	5.05	4.60
CC62AX-2RA	5.20	4.73
CC62AX-2.5RA	5.35	4.87
CC62AX-3RA	5.50	5.00
CC62AX-4RA	5.80	5.28
CC62AX-5RA	6.10	5.55
CC62AX-7.5RA	6.85	6.23
CC62AX-10RA	7.60	6.92
CC174X-1RA	4.90	4.46
CC174X-1.5RA	5.05	4.60
CC174X-2RA	5.20	4.73
CC174X-2.5RA	5.35	4.87
CC174X-3RA	5.50	5.00
CC174X-4RA	5.80	5.28
CC174X-5RA	6.10	5.55
CC174X-7.5RA	6.85	6.23
CC174X-10RA	7.60	6.92

MODEL-Ft	1-9	10-24
CC58CX-1RA	5.10	4.64
CC58CX-1.5RA	5.25	4.78
CC58CX-2RA	5.40	4.91
CC58CX-2.5RA	5.55	5.05
CC58CX-3RA	5.70	5.19
CC58CX-4RA	6.00	5.46
CC58CX-5RA	6.30	5.73
CC58CX-7.5RA	7.05	6.42
CC58CX-10RA	7.80	7.10
CC59BX-1RA	5.10	4.64
CC59BX-1.5RA	5.25	4.78
CC59BX-2RA	5.40	4.91
CC59BX-2.5RA	5.55	5.05
CC59BX-3RA	5.70	5.19
CC59BX-4RA	6.00	5.46
CC59BX-5RA	6.30	5.73
CC59BX-7.5RA	7.05	6.42
CC59BX-10RA	7.80	7.10
CC62AX-1RA	5.10	4.64
CC62AX-1.5RA	5.25	4.78
CC62AX-2RA	5.40	4.91
CC62AX-2.5RA	5.55	5.05
CC62AX-3RA	5.70	5.19
CC62AX-4RA	6.00	5.46
CC62AX-5RA	6.30	5.73
CC62AX-7.5RA	7.05	6.42
CC62AX-10RA	7.80	7.10
CC174X-1RA	5.10	4.64
CC174X-1.5RA	5.25	4.78
CC174X-2RA	5.40	4.91
CC174X-2.5RA	5.55	5.05
CC174X-3RA	5.70	5.19
CC174X-4RA	6.00	5.46
CC174X-5RA	6.30	5.73
CC174X-7.5RA	7.05	6.42
CC174X-10RA	7.80	7.10

MODEL-Ft	1-9	10-24
CC58C-1RA2	6.25	5.69
CC58C-1.5RA2	6.40	5.82
CC58C-2RA2	6.55	5.96
CC58C-2.5RA2	6.70	6.10
CC58C-3RA2	6.85	6.23
CC58C-4RA2	7.15	6.51
CC58C-5RA2	7.45	6.78
CC58C-7.5RA2	8.20	7.46
CC58C-10RA2	8.95	8.14
CC59B-1RA2	6.25	5.69
CC59B-1.5RA2	6.40	5.82
CC59B-2RA2	6.55	5.96
CC59B-2.5RA2	6.70	6.10
CC59B-3RA2	6.85	6.23
CC59B-4RA2	7.15	6.51
CC59B-5RA2	7.45	6.78
CC59B-7.5RA2	8.20	7.46
CC59B-10RA2	8.95	8.14
CC62A-1RA2	6.25	5.69
CC62A-1.5RA2	6.40	5.82
CC62A-2RA2	6.55	5.96
CC62A-2.5RA2	6.70	6.10
CC62A-3RA2	6.85	6.23
CC62A-4RA2	7.15	6.51
CC62A-5RA2	7.45	6.78
CC62A-7.5RA2	8.20	7.41
CC62A-10RA2	8.95	8.14
CC174-1RA2	6.25	5.69
CC174-1.5RA2	6.40	5.82
CC174-2RA2	6.55	5.96
CC174-2.5RA2	6.70	6.10
CC174-3RA2	6.85	6.23
CC174-4RA2	7.15	6.51
CC174-5RA2	7.45	6.78
CC174-7.5RA2	8.20	7.41
CC174-10RA2	8.95	8.14

MOLDED DIP-16 CABLES All Fully Populated - 16 Conductor



MODEL-Ft.	Gender	1-9	10-24	25-99
ML16P-1	Male	3.95	3.59	3.40
ML16P-2	Male	4.25	3.87	3.66
ML16P-3	Male	4.55	4.14	3.91
ML16S-1	Female	3.95	3.59	3.40
ML16S-2	Female	4.25	3.87	3.66
ML16S-3	Female	4.55	4.14	3.91
*Coiled Cord 22" Unstretched				

MODEL-Ft.	GENDER	1-9	10-24	25-99
ML16PP-1	M-M	6.85	6.23	5.89
ML16PP-2	M-M	7.15	6.51	6.15
ML16PP-3	M-M	7.45	6.78	6.41
ML16PS-1.5	M-F	6.95	6.32	5.98
ML16PSS-1.5	M-(2)F	11.45	10.42	9.85
ML16PSC-4*	M-F	8.95	8.14	7.70
ML16PPC-4*	M-M	8.95	8.14	7.70

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Building a Parallel
Continued from page 180

Let's Build It!

Now that you've got the parts together, let's step through the construction process:

1. First, cut down the 22/44 connector (socket) if needed. Cut it down to just 12 pin per side (12/24) to match the User Port edge connector. (Refer to Fig. 1).

2. Using a piece of plastic, bare circuit board, or other non-conductive material, make a "key" to fit in the slot of the edge connector to make proper insertion of the interface connector keyed. Examine the User Port edge connection for proper location of the key. (Refer to Fig. 2)

3. Solder the edge connector to the "experimenter" printed circuit board. Place the back edge of the connector against the edge of the circuit board. Make sure the solder tabs are propely positioned along the edge of the circuit board. Solder the solder tabs or wire wrap pins to the edge connections of the circuit board. (Refer to Fig. 3).

4. Solder the 34 pin PC mount header on the experimenter board. Mount it parallel with the edge connector, about four or five rows of holes from the front edge of the circuit board. (Refer to Fig. 4.)

5. Carefully following the schematic and pin-out diagrams, solder jumper wires from each pad on the edge connector to each pad of a pin on the header. You will have to follow the diagrams and make sure that the proper pins are connected to each other. Take your time here and double check your work. This is the hardest part of the construction and takes the most time. Make sure every connection is right before you hook it up! (Refer to Fig. 5).

6. Trim the excess circuit board away from around the header pins and jumpers. I cut my board down quite a bit. This makes the interface look better. When plugged in the back of the computer, most people won't know that you aren't using a commercially built unit.

7. Connect the interface cable. Plug the 34 pin socket onto the header and connect the Centronics connector to your printer. You are connected!

Testing and Using It

If you have Easy Script, you can immediately start using your printer with it. Just load Easy Script, and choose the printer option on the opening menu that best matches your printer. Option #4, (Other), seems to work for just about anything, so try it if you are not sure. When Easy Script prompts you with (RS-232, Centronics, or Serial) choose "C" for Centronics. Then, you should be able to obtain output from Easy Script on your parallel printer when you print out your text.

For those of you who don't have Easy Script, I have included a BASIC loader version of an ML printer drives. (Refer to listing #1). After connecting the interface, LOAD and RUN this program. You will then be able to OPEN, PRINT, and CMD output to the parallel printer as device #2 (instead of #4 which will still be your Commodore serial printer). For example, after RUNning this program, you should be able to LIST the BASIC program to the printer using this group of immediate commands:

```
OPEN 2,2: CMD 2: LIST:
PRINT#2: CLOSE 2
```

If your printer has an auto-carriage return after line feed (CR after LF), turn it on, since Commodore normally requires that. If you are getting just one line of garbage when you print, that is usually the problem. As an alternative, you may OPEN the printer file with a file number greater than 128 and it will automatically be set up for a CR after LF. (I.E. "OPEN 128,2: CMD 128: LIST: PRINT#128: CLOSE 128")

(I will provide copies of this program on disk or tape for $2.00 & pre-paid return mail mailer. Send requests to me c/o the Computer Shopper.)

Up and Running

This ought to keep you plenty busy for a while! Next month we'll look more at the software driver program and how it works. Eventually, we'll see how to customize it to add new features for different printers. Until next month, happy printing! ●

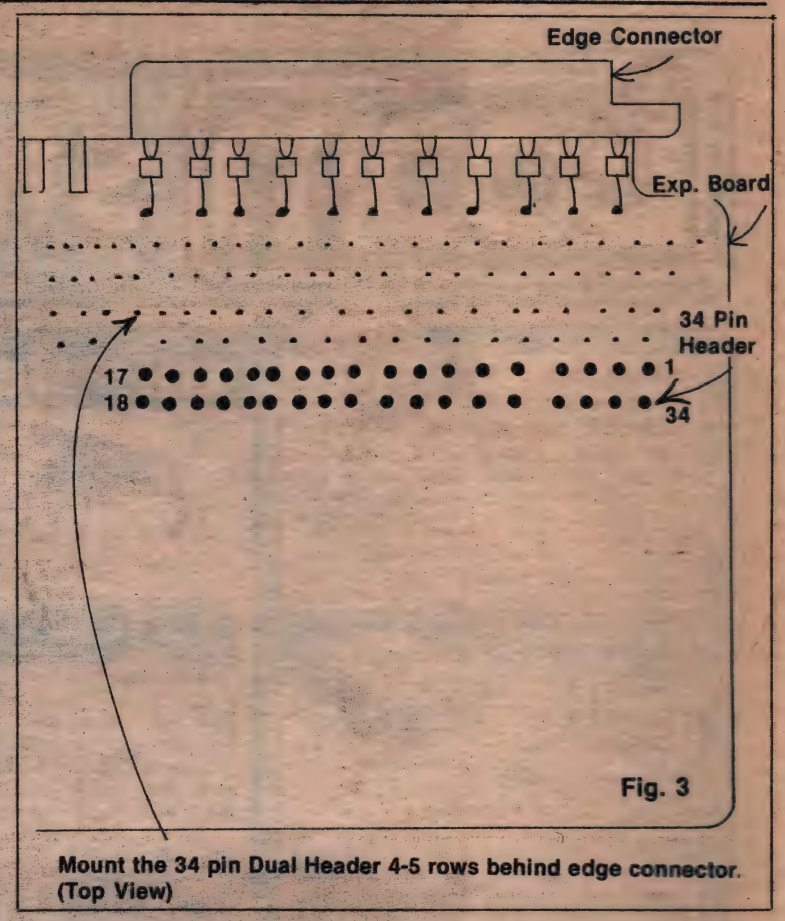
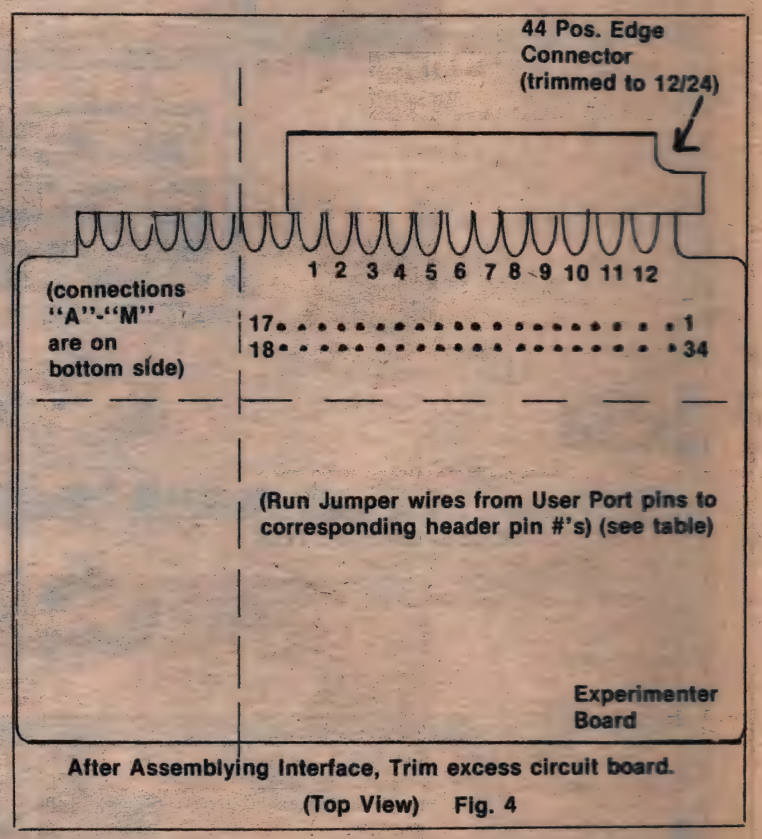


Fig. 3

Mount the 34 pin Dual Header 4-5 rows behind edge connector. (Top View)



After Assemblying Interface, Trim excess circuit board.

(Top View) Fig. 4

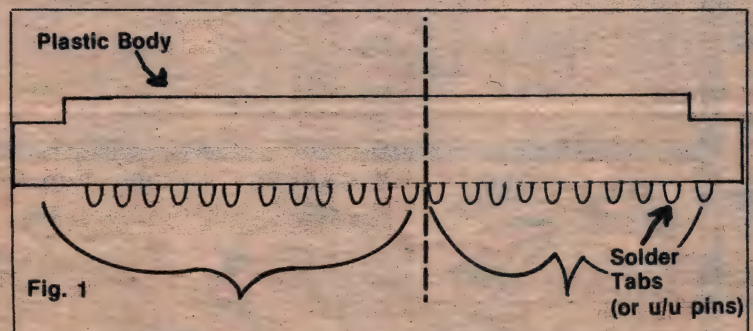
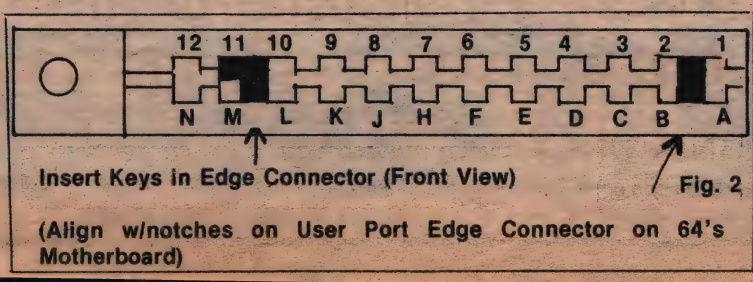


Fig. 1

Cut a 22/44 position card edge connector down to a 12/24 position connector.



Insert Keys in Edge Connector (Front View) Fig. 2

(Align w/notches on User Port Edge Connector on 64's Motherboard)

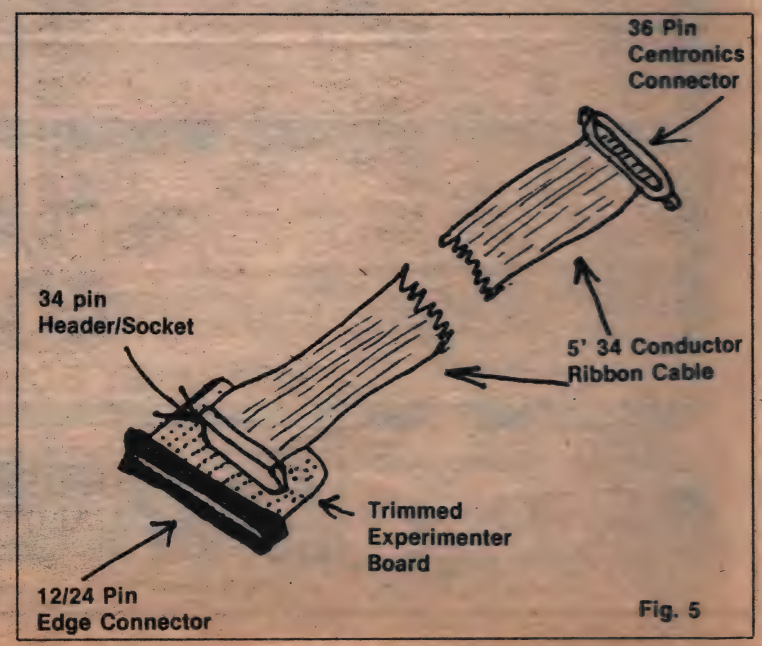


Fig. 5

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6264P-12	(120ns)	8192x8	27.95
6264LP-15	(150ns)	8192x8	24.95
6264P-15	(150ns)	8192x8	19.95
6116LP-2	(120ns)	2048x8	5.95
6116P-2	(120ns)	2048x8	4.95
6116LP-3	(150ns)	2048x8	4.95
6116P-3	(150ns)	2048x8	3.95
6147HP-45	(45ns)	4096x1	5.99
6148P-6	(85ns)	1024x4	5.99
6167P	(70ns)	16384x1	7.99
5114-2	(200ns)	1024x4	4.45
5514APL-2	(200ns)	1024x4	5.95
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appended to the filename; object code with a ".o". This prevents accidently wiping out your source code when you inadvertently use the same filename. It also makes it easy to keep track of which source code goes with which object code.

It is obvious from using the package that the author intended to use it himself. He's put in features that only a programmer would think of. Things like a decimal to hexidecimal/hexidecimal to decimal converter in the editor.

The editor is as good as source code. This little option is great. If you answer yes, Merlin looks through your source code until it finds a "/", the symbol it recognizes as the prelude to the date or other indentification in the program. It puts you in edit mode at that point, so you can change the date and/or version number of the program. When you press the RETURN key, indicating you've edited the line; Merlin saves the file.

Merlin also handles the saves in a very intelligent way. Source code is saved with a ".s" many of the word processors on the market today. Better than some. It has just about everything you can imagine; insert, overwrite, delete, change tabs, replace a line (deletes the line and puts you there in edit mode), find, find and change, go to the beginning of the line, go to the end of the line, restore a line, and delete to the end of the line. The find and change option can be used with character strings or words and allows global changes, changes in lines defined by range (for instance, only lines 5-18), automatic replacement or "ask first." Merlin even has block functions; delete, move, copy, replace and print.

To encourage the use of comments and creation of attractive listings, the author has included a command that prints a row of asterisks or thirty spaces bordered by asterisks. This makes it easy to put boxes

Continued on page 195

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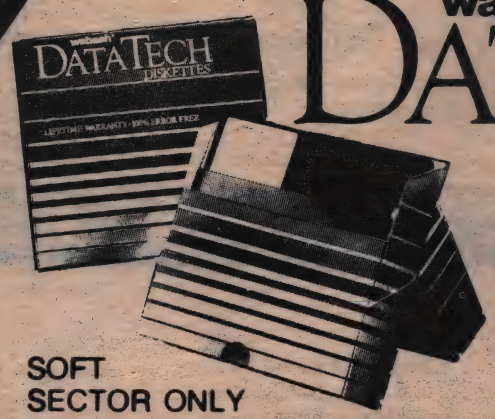

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around subroutines and separate sections that perform different functions.

When printing out your source or object code, you can put it in page format with headers and printer initialization characters. You can print it with or without line numbers. Using a special command, you can also preview how it will look by sending the output to your screen. This lets you see where the page breaks and headers will fall.

Merlin 64 will also create sequencial files that can be read by many word processors or be sent by some terminal packages through a modem. Another option in the editor will take routines generated outside Merlin and convert them so Merlin can use them. This means source code created with other assemblers or obtained over a modem can still be used.

The assembler recognizes all the 6510 mnemonics and many pseudo-opcodes, including EQU, ORG, VAR, END, LUP, ERR, and USR. A few other pseudo-opcodes allow this to be a very flexible program. You can have the source code that is assembling tell the assembler to pull text off the disk and add it to the current source being assembled. This chaining feature allows assembling straight to disk. And yet another allows you to save portions of the assembly to disk. There are a number of other pseudo-opcodes that Merlin uses as well.

The assembler allows conditional assembly, using IF/THEN, ELSE, DO, and FIN. This allows the same source code to be used for different machines or purposes, merely by changing a few EQUATE statements at the beginning of the source code.

The monitor will run any program you've just assembled, so you can see how well it works. Because of the way Merlin is designed, even if your assembled program crashes, you can usually get back into the assembler by doing a SYS to Merlin's origin. Taking a look at the technical information section's memory map will show you how this is possible.

If all this doesn't seem like $50 worth of program, Merlin 64 also includes a disassembler called Sourceror. Using it, assembled code can be broken back down into source code and analyzed. When the disassembly is complete, the source code can be saved to disk.

Merlin has an 80 column generator, so if you have a high resolution screen you can see your source in the wider format. The 80 column program must be run before Merlin is loaded and limits your file size a bit, but for those who like the wider screen, it's a big plus.

One small limitation that I will mention is a line length of 64 characters. For those who are used to assemblers that allow 80 columns, this might seem a bit troublesome. I couldn't really see it as a fault. A good programmer isn't going to have a hassle with this and those who are just learning won't know the difference.

Other utility programs are included on the disk, including one to create a cross referenced listing of labels used in a program. Another strips all the comments from a source listing, making it more compact and allowing for longer programs without having to use nesting.

All in all, this is a marvelous example of good programming at a good price by someone who is more than a little aware of what the user needs. The features and little added extras really give this package some zing. At $50, it's probably under priced. But since when did anyone start complaining about that? ●

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Left/Right/Up/Down
Tab Right/Tab Left
Forward Word/Backward Word
Beginning of Line/End of Line
Scroll Up/Scroll Down
Horizontal Scroll
Top of Buffer/Bottom of Buffer

Block Commands

Copy/Insert/Delete
Lower Case/Upper Case
Fill/Justify
Print/Extract

File Commands

Directory
Show File
Insert File
Delete File
Append File

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NET-WORKS Magnetic Fantasies Los Angeles. CA 213-388-5198
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PASBBS Torrance. CA 213-516-7089 *24
PMS Los Angeles. CA 213-334-7614 *24
PMS O.A.C. Woodland Hills. CA 213-346-1849 *24
RCP/M RBBS Downey. CA 213-861-2313 *24
RCP/M CBBS Pasadena. CA 213-799-1632 *24
RCP/M RBBS BBS Valley 213-360-5053
RCP/M RBBS Palos Verdes. CA 213-541-2503 *24
RCP/M RBBS Softwar Store Los Angeles. CA 213-296-5927 *24
ABBS Dallas Info Board 214-248-4539
ABBS Teledunjon Dallas. TX 214-960-7654
ABBS Teledunjon I Dallas. TX 214-530-0858
ABBS The Moon. Dallas. TX 214-931-3437. 3436. 3438. 3439
AMIS Allen. TX 214-727-2824 *24
AMIS Dallas. TX 214-680-9018
BBS-80 DALTRUG Dallas. TX 214-235-8784 *24
BULLET-80 Hawkins. TX 214-769-3036
METROPLEX CP/M INTEREST GROUP RBBS/RCPM Plano. TX 214-867-2068 *24
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NET-WORKS Apple Shack. Dallas. TX 214-644-4781 *24
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NET-WORKS Winesap Dallas. TX 214-824-7455
RCP/M CBBS Dallas. TX 214-913-8274
AMIS BBS. Pennsylvania 215-333-3753
AMIS Pennsylvania 215-250-9471
AMIS Pennsylvania 215-432-9848
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COMPCOM 215-968-0170 300/1200 *24
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LEHIGH PRESS BB, PA 215-435-3388
RBBS Pennsylvania 215-398-3937
RBBS Pennsylvania 215-836-5116
TBBS Reading. PA 215-929-5348
ABBS Akron Digital Group. Akron. OH 216-745-7855 *24
AKRON DIGITAL GROUP Akron. OH 216-745-7855 *24
ARCADIA BBS Akron. OH 216-644-1014
ATARI Ohio 216-582-2797
ATARI EXPRESS Akron. OH 216-253-9247
ATARI PRISM Akron. OH 216-867-2422
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BIG BOARD (CP/M) Akron. OH 216-745-7819
BULLET-80 Chesterland. OH 216-729-2769
CAMELOT ATARI BBS Akron. OH 216-864-7002 *24
COMNET-80 Akron. OH 216-645-0827 *24
COMMODORE'S BRIDGE Akron. OH 216-929-1454
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ABBS Lincolnwood. IL 312-764-6502
ABBS Rogers Park. Chicago. IL 312-973-2227
AMIS Bellwood. IL 312-544-7228
AMIS Chicago. IL 312-789-3610 *24
AMIS Lombard. IL 312-620-6441
The BASIC BBS Aurora. IL 312-896-9628 3pm-11pm
CBBS Chicago. IL 312-545-8086 *24
CBBS Chicago. IL 312-876-0974
CBBS Dolton. IL 312-849-1132
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NESSY Chicago. IL 312-773-3308
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COLOSSUS-TIBBS SYSTEM Wichita. KS 316-687-4307
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INFOEX 80 316-722-9526
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S.C.S. ABBS Lt. Suamico, WI 414-434-3253 8pm-7am
TIBBS Appleton, WI 414-739-5380
TIBBS Freedom, WI 414-788-9730
TBBS Canopus, Milwaukee, WI 414-281-0545 *24
ABBS Computerland, Fremont, CA 415-794-9314
ABBS Hayward, CA 415-881-5662
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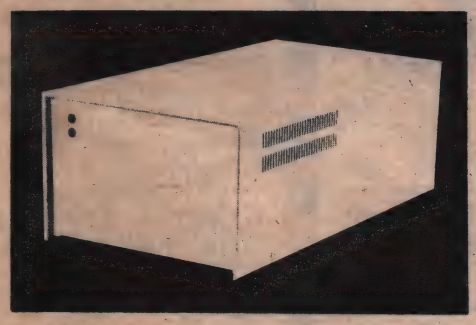

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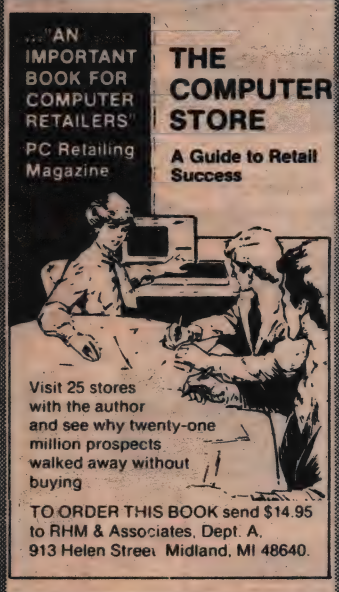

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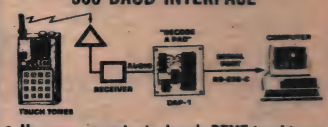

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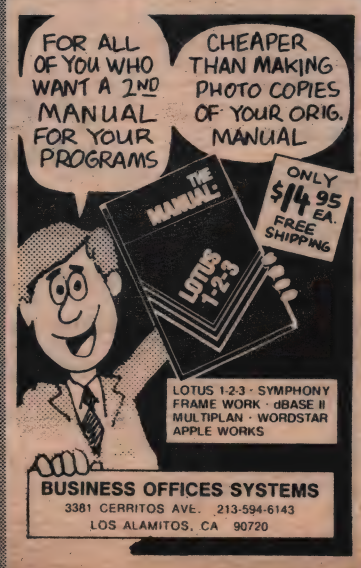

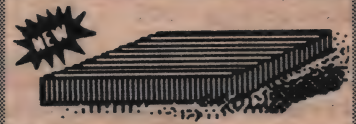

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SOFTWARE SHOPPING LIST

NAME: INVESTCALC
TYPE: Personal Finance Management
COMPUTER: Timex/Sinclair 2068. Cassette based.
DESCRIPTION: Provides quick answers to complex problems involving various investment alternatives from Stock Transactions to Real Estate and includes Bond Yields to maturity, T-Bill BEY, Certificate of Deposit, Fund Management and more.
PUBLISHER: MACSHAK SOFTWARE, 73-310 Ironwood Street, Palm Desert, CA 92260.
COST: $19.95 Plus $2.00 P&H. CA residents add 6 percent sales tax.

NAME: GENIE83
TYPE: Dog Race Handicapping Program
COMPUTER: Radio Shack Model I, III, IV, 1000, 1200 & Color, VIC 20, Commodore 64, TI 99/4A, CPMBO Computers, IBM PCs and Compatibles
DESCRIPTION: The program provides recommended plays for WIN, QUINELLA and TRIFECTA wagering. The complete order of finish and approximate odds for each dog is also provided. Data can be entered from any track in the country and the program will adjust it for course and track variations. The program is simple to use and requires no handicapping experience. Tests show over 100 percent profit in a racing season. A descriptive brochure is available.
PUBLISHER: GENIE Computer Services, P. O. Box 1962, Pompano Beach, FL 33061.
COST: Cassette - $29.95, Disc - $34.95
Florida residents add 5 percent sales tax.

NAME: WORDMARC
TYPE: Software Word Processing Package
COMPUTER: IBM PC/AT, PC, PC/XT and compatibles, including the Zenith 150, Compaq, Corona, Columbia, Eagle and Televideo PC.
DESCRIPTION: Offers a software solution to alternate character set display and printing and gives the users the ability to create special character sets that can be seen on the screen and downloaded to the printer.
PUBLISHER: MARC Software International, 260 Sheridan Avenue, Suite 200, Palo Alto, CA 94306 (415) 326-1971.
COST: $495.00

NAME: XTRIEVE AND BTRIEVE
TYPE: Data Base Software
COMPUTER: IBM PC, XT, and compatibles, and Texas Instruments Professional Computer
DESCRIPTION: File management and record retrieval system
PUBLISHER: SoftCraft, Inc., P. O. Box 9802 No. 917 Austin, Texas 78766 (512) 346-8380.
COST: $195.00

NAME: COINS
TYPE: Coin Collecting Program
COMPUTER: IBM, Apple and Radio Shack
DESCRIPTION: This program enables the serious numismatist to catalog his or her entire coin collection and obtain various reports that serve for personal investment information
PUBLISHER: COMPU-QUOTE, 6914 Berquist Avenue, Canoga Park, CA 91307, (818) 348-3662.
COST: $95.00

NAME: GET ORGANIZED!
TYPE: Integrated Personal Productivity Software Program
COMPUTER: IBM PCjr, PC, XT, AT and compatible computers
DESCRIPTION: This program combines a full-function word processor with a Rolodex-style address book, an index card filing system, telecommunications, a calendar, a calculator, and a notepad. Key features include mail merge, file merge, automatic phone dialing and electronic mail.
PUBLISHER: Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403, (415) 571-7171
COST: $99.00

NAME: QTIME
TYPE: Menu-driven information management system
COMPUTER: IBM PC-XT and compatibles
DESCRIPTION: This System enables the user to query and retrieve data on demand and to design applications and management information reports.
PUBLISHER: National Product Marketing, Two Northside 75, Atlanta, Georgia 30318, (404) 351-2902
COST: $695.00

NAME: K-GRAPH
TYPE: Data Base Management System
COMPUTER: HP 150 and Texas Instruments Professional Microcomputer
DESCRIPTION: This program integrates a relational data base management system with a third-generation spreadsheet, ad hoc queries, a structured programming language, on-line help facility, and comprehensive security features.
PUBLISHER: Micro Data Base Systems, Inc., P. O. Box 248, Lafayette, IN 47902
COST: $225.

NAME: EXECUTIVE WRITER
TYPE: word processing program
COMPUTER: IBM PC, PC/XT
DESCRIPTION: An easy to use, powerful word processing program.
PUBLISHER: Paperback Software International, 2612 Eighth Street, Berkeley, CA 94710, (415) 644-2116.
COST: $69.95

NAME: EXECUTIVE FILER
TYPE: filing and indexing system
COMPUTER: IBM PC, PC/XT
DESCRIPTION: Complete system for filing, indexing, and retrieving text, graphics, spreadsheets - almost anything that can be put on disk.
PUBLISHER: Paperback Software International, 2612 Eighth Street, Berkeley, CA 94710, (415) 644-2116.
COST: $49.95

NAME: AUTOMATIC TEST AUTHOR (ATA)
TYPE: educational
COMPUTER: Available for most popular computers
DESCRIPTION: This program offers the teacher the four most commonly accepted drill/test formats, multiple choice, fill in the blank, essay and true false.
PUBLISHER: Resource Software International, inc., 330 New Brunswick Avenue, Fords, New Jersey 08863, (201) 738-8500.
COST: $89.95

NAME: AUTOTRACE
TYPE: Compiled BASIC Debugger
COMPUTER: IBM PC and true compatibles; DOS 2.x
DESCRIPTION: Single-step or continuous trace COMPILED or interpreter BASIC programs. AUTOTRACE lets you trace variable values and BREAK on variables or line numbers. You can change variable values at any time. RECALL displays that scroll off the screen to pinpoint errors. Full 80-column print out saves paper; only CHANGED variable values printed. Save trace output to disk. Includes TRACE, SCREEN RECALL, RAMdisk, SPOOLER.
PUBLISHER: Timeshare Associates, Inc. 10202 Robinson, Overland Park, KS 66212, (913) 642-7564.
COST: $49.95

NAME: STOCK MIZER
TYPE: technical analysis and portfolio manager
COMPUTER: IBM PC
DESCRIPTION: The portfolio manager records transaction price, dates, commission costs, and number of shares. One may view current portfolio values as well as past performance.
PUBLISHER: Knowledgeware Systems, Inc., 4114 Wildwood Drive, NE, Ham Lake, MN 55203, (612) 784-4789.
COST: $129.95

NAME: GEOMETRY
TYPE: home education software
COMPUTER: Apple II with minimum of 48K-3, 3DOS-4
DESCRIPTION: A 4 disk series which covers important topics in plane geometry. Each disk contains a minimum of 12 programs, a cumulative test, and a glossary, and is accompanied by a comprehensive user's manual.
PUBLISHER: Educational Courseware, 67A Willard Street, Hartford, CT, 06105, (203) 247-6609.

NAME: THE PRINT SHOP
TYPE: A program for designing greeting cards
COMPUTER: Atari
DESCRIPTION: THE PRINT SHOP enables you to write, design, and print your own greeting cards, stationary, letterhead, signs and even banners. Designed to be easy and fun, the program doesn't require talent or special knowledge of computer graphics
PUBLISHER: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101, (415) 479-1170.
COST: $44.95

Software Shopping List Continued

NAME: CHEMISTRY
TYPE: home education software
COMPUTER: Apple II with minimum of 48K-3.3 DOS-2
DESCRIPTION: A two disk program which covers the history of chemistry in an action graphics filled tutorial. It introduces the three states of matter using simulated illustrations of chemical activities and follows up with a graph game to aid in retention of ideas about the three states of matter. A tutorial introducing the kinetic-molecular theory is also provided. Disk 2 contains a review of the kinetic-molecular theory and a further tutorial on this topic.
PUBLISHER: Educational Courseware, 67A Willard Street, Hartford, CT, 06105, (203) 247-6609.

NAME: WHERE IN THE WORLD IS CARMEN SANDIEGO?
TYPE: entertainment game
COMPUTER: Apple II+, IIe or IIc with at least 64K of memory and one disk drive
DESCRIPTION: This game is filled with all the intrigue and excitement of an international mystery. As you unravel the mystery, you can't help but learn about world geography, since all the clues include facts about different countries. This game comes with a 1985 World Almanac and Book of Facts(R).
PUBLISHER: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101, (415) 479-1170.
COST: $39.95, including the 1984 World Almanac and Book of Facts(R).

NAME: KARATEKA
TYPE: entertainment game
COMPUTER: Apple II+, IIe and IIc (minimum of 48K memory), and the Commodore 64
DESCRIPTION: KARATEKA is an action game with a story line, characters, and remarkably realistic sound and animation.
PUBLISHER: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101, (415) 479-1170
COST: $34.95 for the Apple version and $29.95 for the Commodore 64 version

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NAME: JANE 2.0
TYPE: idon-based software program
COMPUTER: Commodore 128
DESCRIPTION: It is a fully integrated program featuring word processing, spreadsheet and filing functions, and can be used by the computer expert and novice alike
PUBLISHER: Commodore International, Ltd., 1200 Wilson Drive, West Chester, PA, 19380, (215) 431-9100

NAME: NAVIGATION PAC PLUS
TYPE: marine navigation program
COMPUTER: IBM PC (disk), Apple II+, IIe, IIc (disk), Commodore 64 (disk or cassette), TRS-80 Model I, III, IV (cassette), TRS-80 extended Color (cassette), TRS-80 Model 100 portable 24K (cassette)
DESCRIPTION: A program that has built in almanac data for the sun and 57 stars - from 1983 until the year 2000
PUBLISHER: Celestial Software, 11 David Drive, New Port Richey, FL 33552, (813) 847-2963
COST: $39.95 plus $2.00 for shipping

NAME: DRAW-IT
TYPE: full-screen drawing program
COMPUTER: IBM PC, PC/XT, PC/AT or compatible computer with 192 K or memory, DOS version 2.00 or higher, and a color graphics display
DESCRIPTION: DRAW-IT is a full-screen drawing program for creating four-color pictures which includes drawing commands for dots, lines, circles, ellipses, and boxes. A "zoom" command enlarges images in a manner similar to the "fat bits" mode of the Apple MacIntosh.
PUBLISHER: Paperback Software International, 2612 Eighth Street, Berkeley, CA 94710, (415) 644-2116
COST: $29.95

NAME: REAL ESTATE GENIUS
TYPE: real estate professional program
COMPUTER: Commodore 64
DESCRIPTION: REAL ESTATE GENIUS allows individual real estate brokers and agents to electronically advertise their inventory and services 24 hours a day. It is designed to provide an additional avenue of advertising properties and services to the public as well as a means to increase a customer/client base.
PUBLISHER: Matchmaker Enterprises, P. O. Box 6055, Burbank, CA 91510, (818) 840-8211

NAME: PRINTWORKS
TYPE: multi-function printer control software package
COMPUTER: IBM PC and compatible systems
DESCRIPTION: This package prints wide documents, like spreadsheets, sideways on standard-width paper. Pivot Printing is one of the many features available in this software package. Additionally, Printworks offers easy menu selection of many printer functions including pitch, mode, and font.
PUBLISHER: SoftStyle, Inc., 7192 Kalanianaole Highway, Suite 205, Honolulu, HI 96825, (808) 396-6368
COST: $69.95

NAME: PEGBOOKS
TYPE: Accounting Program
COMPUTER: MS-DOS and CP/M
DESCRIPTION: PEGBOOKS is a simple, straightforward approach to computerized bookkeeping, keeping track of sales, purchases, receipts, disbursements, transaction histories, the checking account register and important dates all at once.
PUBLISHER: San Diego Computer Corporation, 256 Witherspoon Way, Suite N, El Cajon, CA 92020, (619) 463-2422.
COST: $25.00

NAME: STATWORKS
TYPE: Statistical Analysis Package
COMPUTER: MacIntosh
DESCRIPTION: This package allows practically anyone to analyze data sets with simplicity and puts the power of statistical analysis within everyone's reach.
PUBLISHER: Heyden & Son, 247 South 41st Street, Philadelphia, PA 19104, (215) 382-6673

NAME: EXEC*U*STAT
TYPE: Statistical software package
COMPUTER: IBM PC or compatible system with 256 bytes of RAM, two disk drives, a graphics card, and a high resolution graphics board
DESCRIPTION: EXEC*U*STAT integrates statistical and graphics procedures specifically designed to enable today's executives to make use of modern statistical and data analysis techniques.
PUBLISHER: EXEC*U*STAT, Inc., Research Park, 2 Wall Street, Princeton, NJ 08540, (609) 924-9357
COST: $495.00

NAME: COMPU/CHART
TYPE: Market level stock charting program
COMPUTER: IBM-PC, XT, PCjr, all MS-DOS & CP/M systems
DESCRIPTION: COMPU/CHART uses the entire 80-column screen to plot the action of 73 stock market trading days and prints a hard copy for the last 56 trading days on a continuous feed printer.
PUBLISHER: NewTEK Industries, P. O. Box 46116, Los Angeles, CA 90046, (213) 874-6669
COST: $99.95

NAME: PLANTPLAN
TYPE: Building and grounds data system
COMPUTER: Designed to run on most micro computers
DESCRIPTION: PlantPLAN can be used to prepare repair reports, generate yearly summary reports and allows you to organize repair activity by trade.
PUBLISHER: DacorMFG Software Systems, 13330 Bishop Road - Box 269, Bowling Green, OH 43402, (419) 354-3981

NAME: MICRO PMS
TYPE: Portfolio management system
COMPUTER: IBM PC and IBM PC XT with 128K memory, two 360kb disk drives or one drive and a hard disk.
DESCRIPTION: Micro PMS provides comprehensive investment information to make investing easier and more profitable.
PUBLISHER: Micro PMS Group, The Boston Company, One Boston Place, Boston, MA 02106, 800-468-8324 or (617) 722-7928
COST: $495 per year.

NAME: GOLF HANDICAPPER
TYPE: A program for storage of golf handicap information
COMPUTER: IBM PC and PCjr
DESCRIPTION: Golf Handicapper allows you to compute, store, update, and print golf stroke handicap information for up to 75 playsers.
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PUBLISHER: Personal Computer Products, 11200 Lockwood Drive, Suite 307, Silver Springs, MD 20901
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Due to low classified rates a free checking copy or tear sheet cannot be sent if proof of insertion is desired, please send $3.00 extra.

PHOTOS

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STARS

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It's a fact...unusual "artwork" in or above an ad draws attention that ad and the reader retains interest in that product longer.

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CS-ABBREVIATIONS

add-post . . . . . add postage
add-post-AP . . . add postage, all prices
FC . . . . . Freight Collect
MBG . . . . . money back guarantee
PP . . . . . postage paid
SASE . . . . . send self-addressed stamped envelope for check return or information requested
10 DRP . . . . . 10 day return privilege
CCR . . . . . check clearance required

EXAMPLE OF STYLES:

Normal

PDP 11/03 COMPUTER. Complete operating system with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at: 11/03 Computer $900. Dual RX-1 disk $1,000. 32KB memory $2,800. VT-52 video $1,500. GE Terminet 30 printer $800. Intertube video terminal $400. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

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Individual Listings

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11/03 Computer $900
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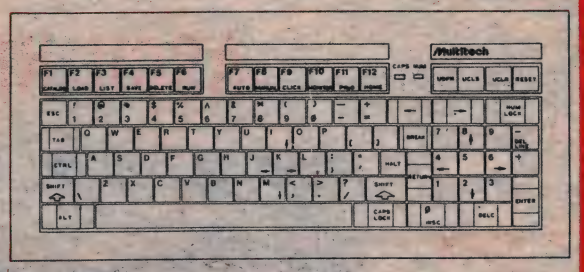

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All of these bare PCB's come with a parts list and placement diagram. In some cases you will also need software/firmware to operate these cards. This must be composed or found from a users group, we will not supply it.

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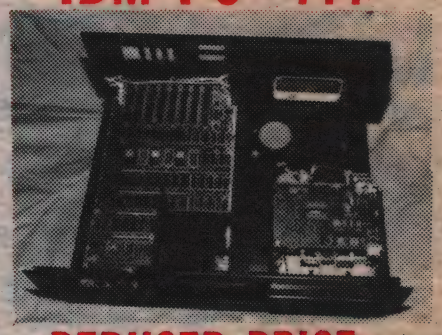

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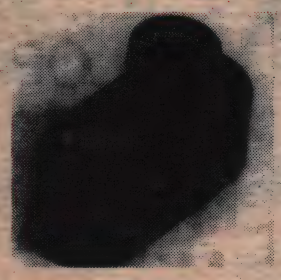

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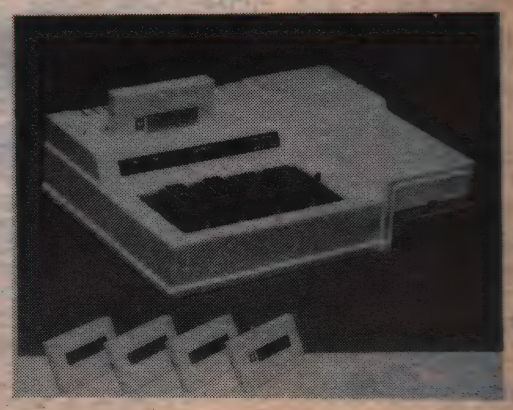

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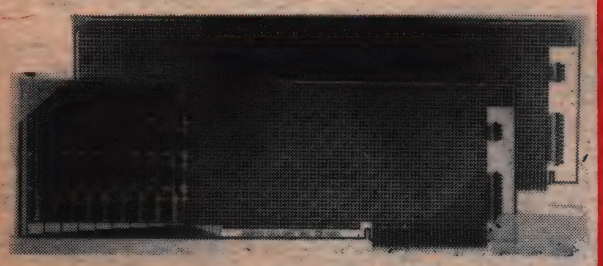

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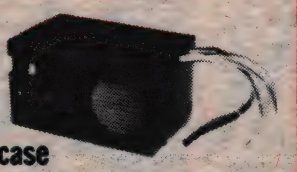

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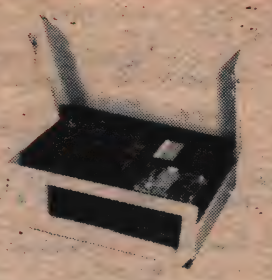

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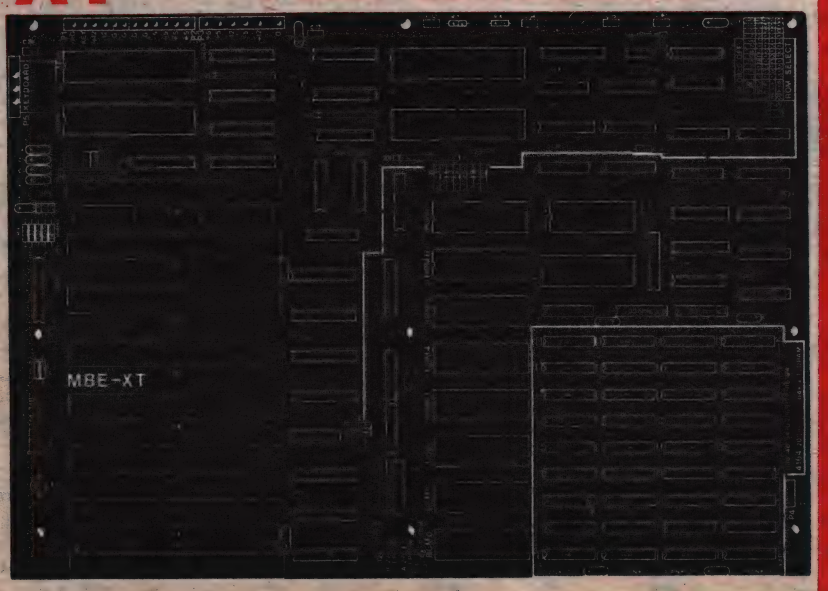

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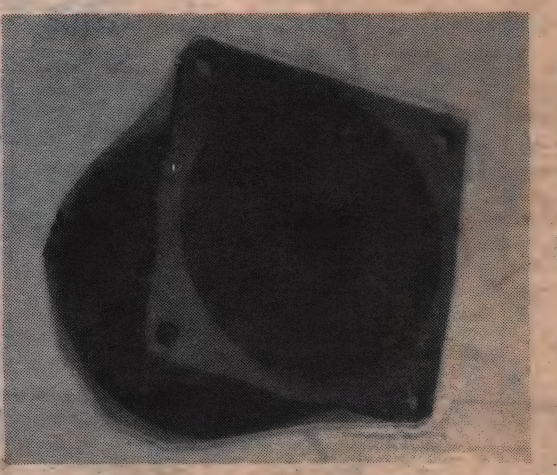

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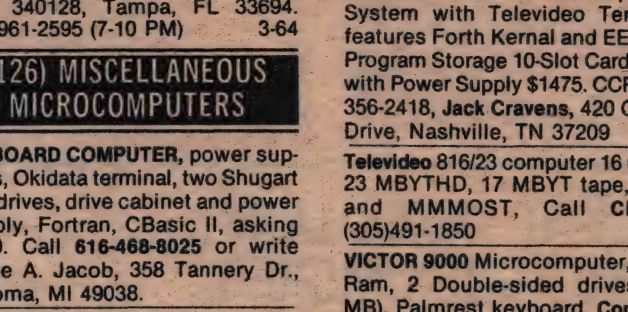

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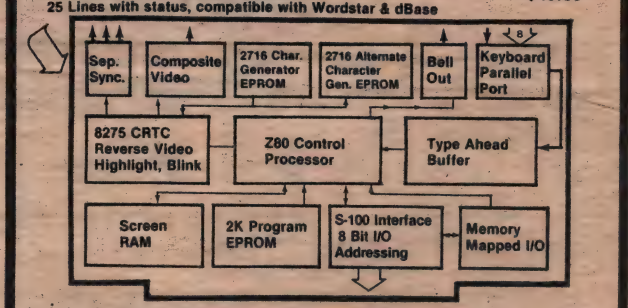

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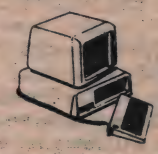

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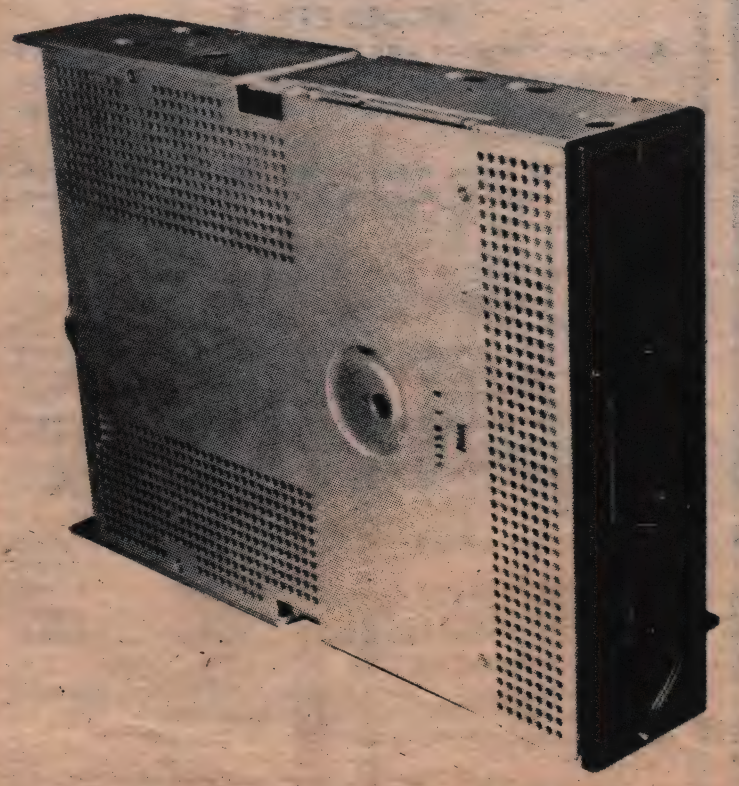

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(174) PRINTERS

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ATTENTION Epson and Gemini Printer Owners!
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DECWRITER LA-34 with keyboard and upper/lower case. $400. **Baird,** 1408 Harvard, Cocoa, FL 32922, (305)636-6578 4-64

DETACHABLE KEYBOARD for Dynax, Brother or Comrex printer; never used; asking $125; Also Osborne compatible Signalman Mark V Modem with software, asking $75, Call **Gary at 817-662-3587**

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DIABLO 630 with 2 BIN-Cut sheet feeder $2980.00, 620 $787.00, Gemini G10 $219.00 Gemini Power Mate $439.00, NEC 3510 $1379.00, Okidata 845 $798.00. The above units are demos, carry full warranty, call **305-491-1850,** CJP Enterprises, 4834 N 12 Ave, Ft. Lauderdale, Florida 33334 4-65

DIABLO PRINTER mechanisms tested and adjusted with all boards platten ribbon printwheel factory manual model 1200, Hy-type I less cover and power supply $125.00, **919-833-9672,** Ham Cooper, 1313 Brown Straw Dr., Raleigh, NC 27610 3-66

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Diablo 1620 KSR 45cps letter quality, 1200 baud RS-232, keyboard send/receive, adjustable tractor, programmable 132 chr/line, w/user service manuals $800. Digital LA-36 KSR 30 cps dot matrix w/stand, RS-232, 132 chr/line, $400. Trivex 720 120cps dot matrix 132 chr/line, parallel, w/user service manual need minor repair $200. Datasouth DS-120 controller converts LA-36 to LA-120 $250. **Vance,** 6pm-10pm EST 704-324-8120

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(176) PUNCHED CARD EQUIPMENT

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Plug-in 300 baud modem for Apple IIe & II+. Hayes Micromodem IIe hardware and software compatible. Auto answer, auto dial, includes software. Made in USA. 2 year warranty. Never used $145. Also, networker modem for $95. **The Micro Place,** 3575 Haynie Road, Blaine, WA 98230, (206)332-6363, $3 shipping. 4-64

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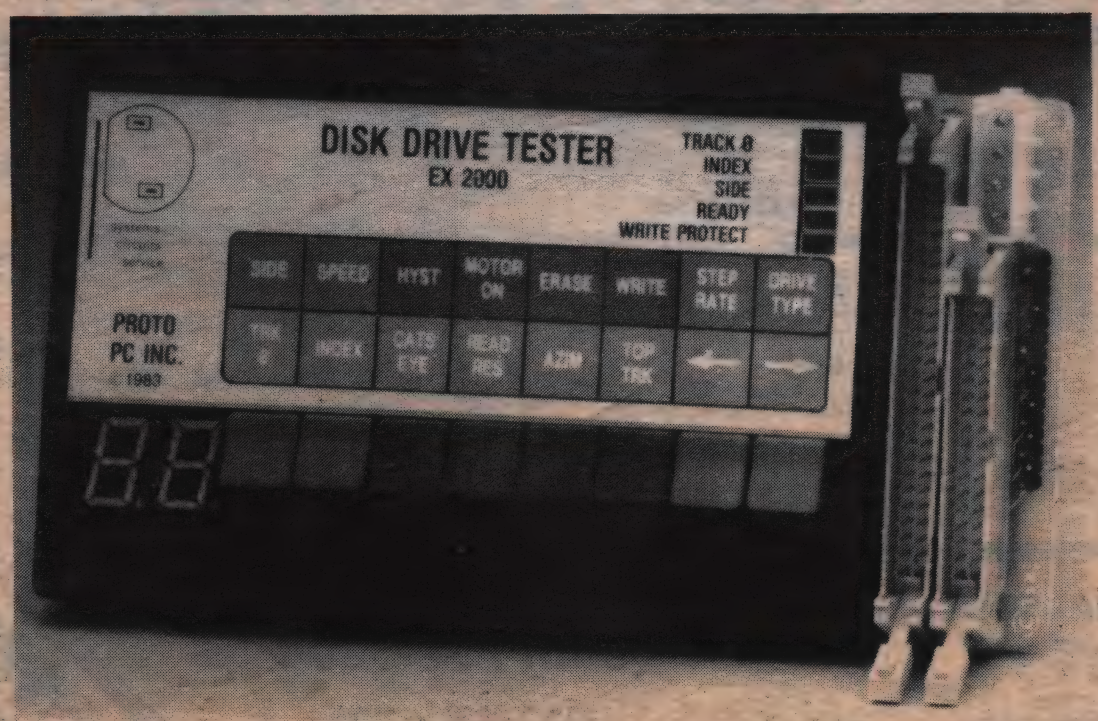

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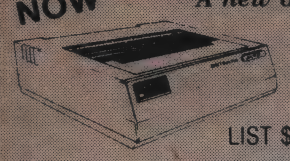

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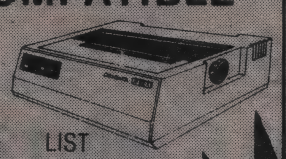

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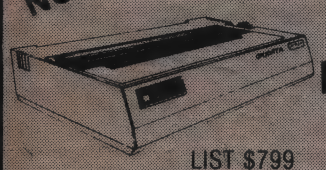

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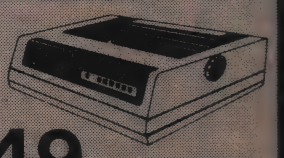

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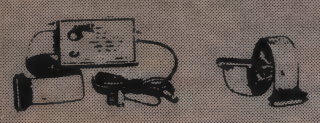

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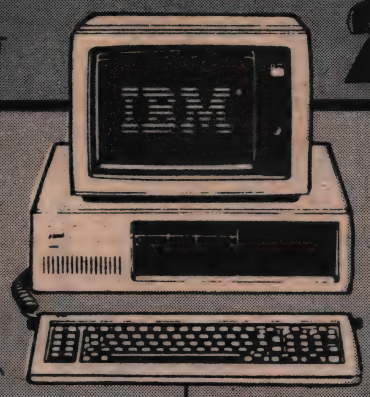

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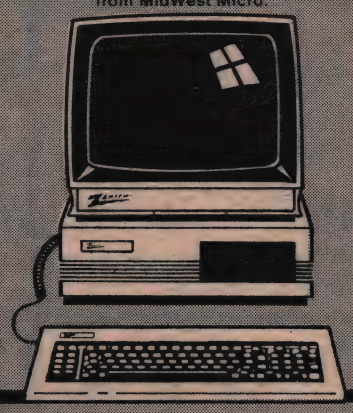

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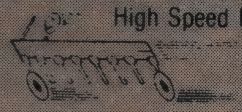

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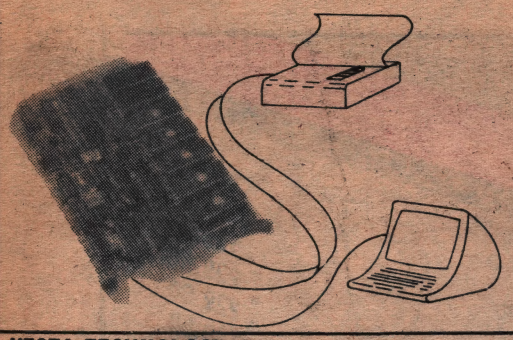

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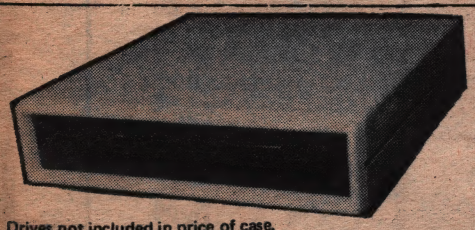

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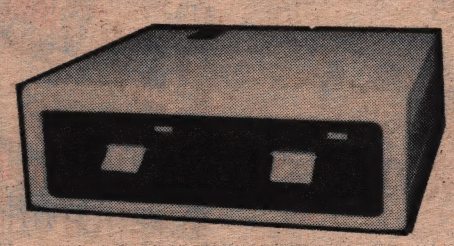

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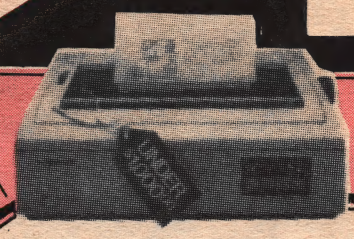

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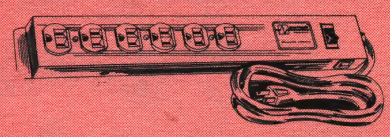

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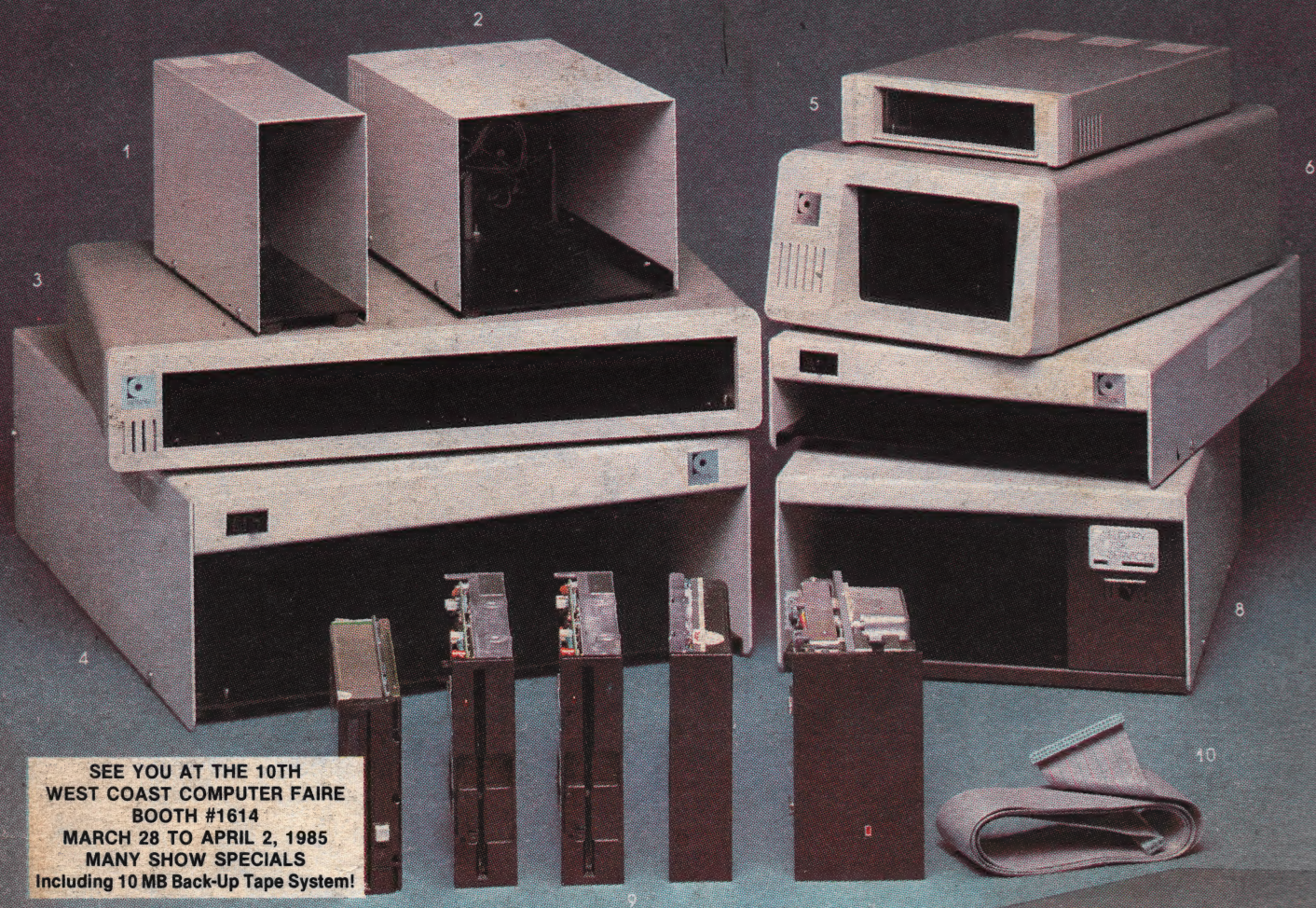

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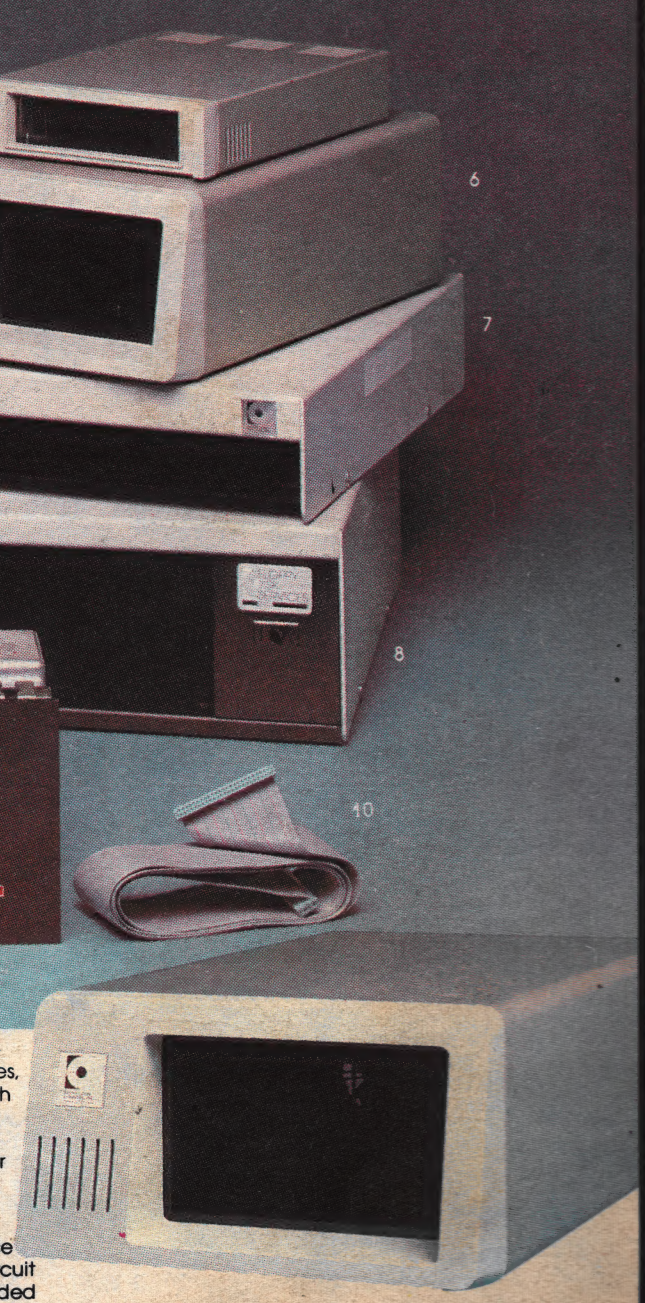

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